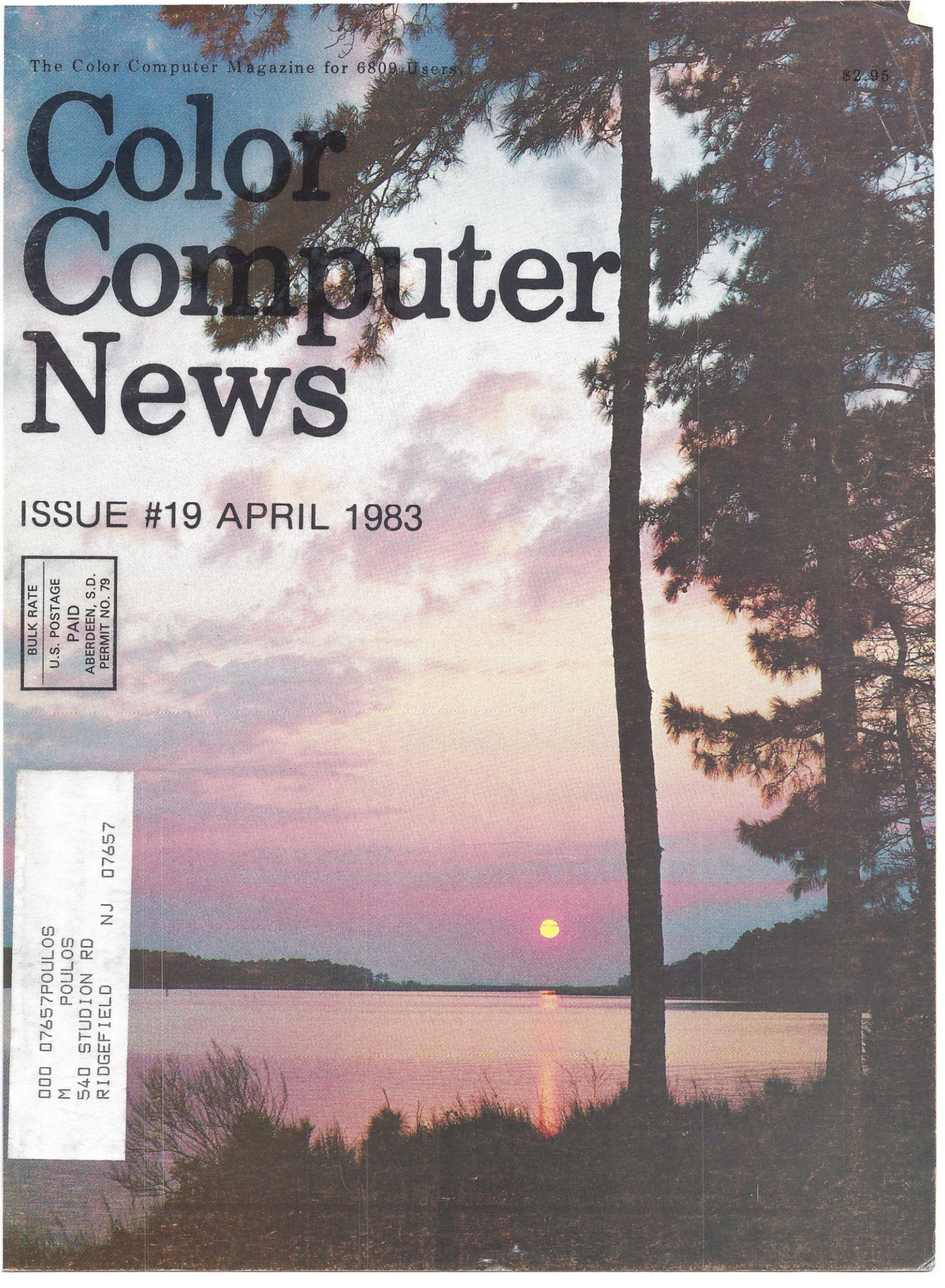

The Color Computer Magazine for 6809 Users

$2.95

# Color Computer News

ISSUE #19 APRIL 1983

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Forum Sixty-Eight

Color Computer News

If the same old news and reviews cause you to snooze then choose:

## Forum Sixty-Eight

Forum Sixty-Eight is new to date
and will prove itself real soon.
So rouse from your slumber
and get the first number
Cause the first issue's coming in June.

Forum Sixty-Eight is the journal for Motorola Microprocessors. The forum covers business, scientific and recreational computing.

or

## Color Computer News

Color Computer News will wake your computer
and open your eyes up wide.
And soon you'll discover
from cover to cover
there's lots of good info inside.

Color Computer News is the *original* Color Computer magazine covering the entire spectrum of Color Computing from beginner to advanced.

REMarkable Software, Inc.
P.O. Box 1192
Muskegon, MI 49443
(616) 728-9100

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# Color Computer News






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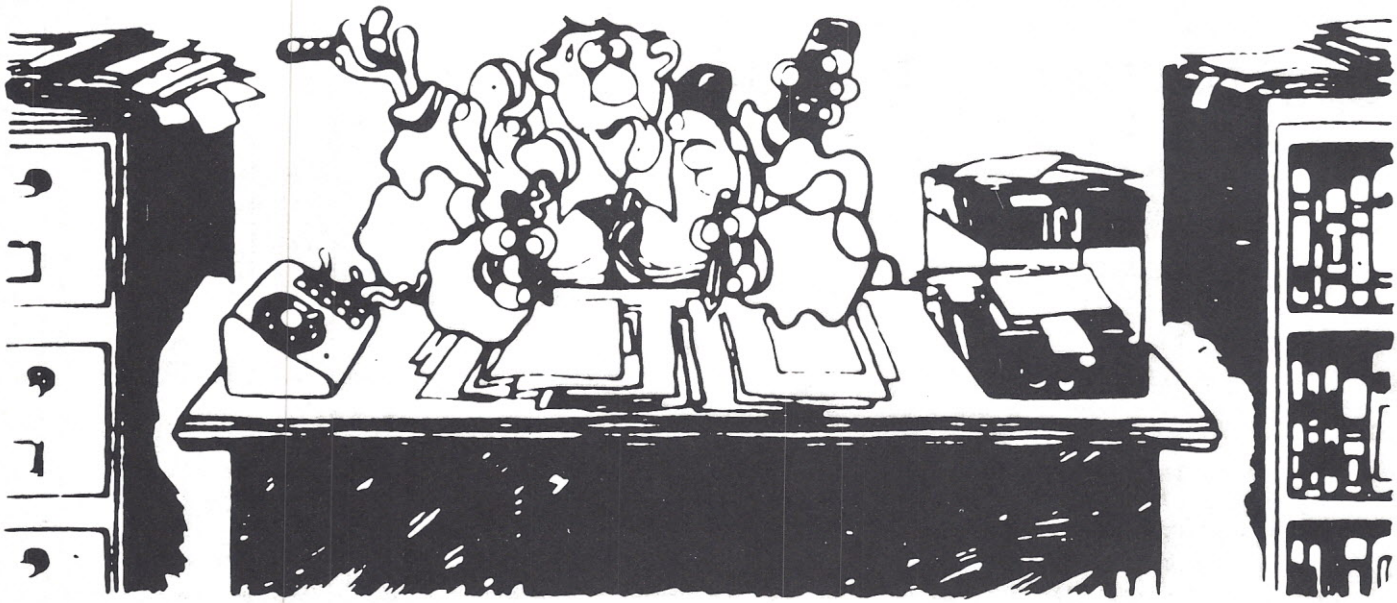
8:00 am to 4:00 pm EST.

REMarks
by Bill Sias

Big News



Next month is the second birthday for Color Computer News. Its hard to believe that two years have gone by so rapidly. In celebration of these years I'm pleased to announce that REMarkable Software will introduce its second magazine, Forum Sixty-Eight. Forum Sixty-Eight will have a June 1983 cover date and will be dedicated to user's of Motorola microprocessors, these include the 6800, 6809 and 68000 to name just three. Forum 68 will support all the major operating systems including Flex, OS9, UniFlex, and Unix (and it's clones).

Forum Sixty-Eight will be directed more toward Business, Engineering and Advanced hobbyists rather than just a hobby magazine. Although Forum Sixty-Eight will handle more technical 6809 topics we will continue to support the Color Computers (Radio Shack, TDP100 and Dragon 32) with advanced as will as intermediate and beginner material in Color Computer News.

One concern that has been expressed to me is the fear that with Forum Sixty-Eight being new we may be tempted to ''steal'' Color Computer News material to help fill out pages. While its true that there will be some Color Computer material it will only be items that are equally applicable to other 6809 computers.

The cover and subscription prices for Forum 68 will be the same as Color Computer News with the exception that Color Computer News subscribers may subscribe to Forum 68 for only $18.00. The obvious question is, ''Why would I want a subscription to both*0*''. I think the primary reason would be to stay up on what's happening with larger computers and since a lot of 6800 and 6809 programs are easily adaptable to the Color Computers it will make a lot of new items of interest available to you.

We are actively seeking writers for Forum 68 so please contact my editorial department for more details.

The ''Have I got a deal for you'' department

Its my goal to make Color Computer News and Forum 68 available to everyone that has a Color Computer or a 68XX computer and to meet my goal I'm looking for some hard working people to distribute our magazines and books to retailers in their home towns. The responsibilities would include selling, stocking and billing accounts in a specified territory. If you are interested in representing REMarkable Software in your area send a large self-addressed stamped envelope to:

Distributor Program
REMarkable Software, Inc.
1781 Fifth St.

Muskegon, MI 49441

# Turn your color computer on to the power of FLEX

**NOW FROM THE WORLDS LARGEST SUPPLIER OF SOFTWARE FOR FLEX COMES FHL COLOR FLEX. JUST LOOK AT THESE FEATURES:**

**IF YOU'RE TIRED OF NO DISK SOFTWARE,**

**THEN FHL Color FLEX IS THE ANSWER!**

FLEX is the world's most popular operating system for the 6809 and with over 150 programs, we are the largest supplier of software for FLEX. These programs are NOT games but serious programs for your Color Computer. They range from word processors thru business applications to software development tools. Many Fortune 500 companies use our software.
FHL Color FLEX turns your Color computer into a powerful system more capable than systems costing several times as much.


## FLEX NOW ONLY $99

- NEW - "Tiny Editor"
- NEW - Interactive Assembler (Tiny ASM)
- NEW - Machine Language Monitor
- NEW - Video attributes include status lines, protected lines, and inverse video
- Hi-Res screen formats
- 16 x 32 and 24 x 5l, upper and lower case characters
- 24 x 64 and 32 x 64 upper case
- Full ASCII keyboards
- Easy start-up—just type "FLEX"
- On-line assistance—Just type HELP
- Optionally use a standard terminal and printer
- Advance disk I/O and terminal capabilities - Supporting 35, 40, and 80 track single or double sided, single or double density drives
- No additional hardware required
- We have supported FLEX with more than any one else in the world for more than two years!

## SPECIAL

1. DBASIC, RS Disk Basic under FLEX with a utility to copy RS to FLEX disk $30.
2. ED/ASM, line and screen editor with conditional macro assembler, both more powerful than TSC's and at the same cost, only $100.
3. COLOR UTILITIES, a set of 12 utilities especially designed for FHL COLOR FLEX $50.

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# STYLOGRAPH
# 6809 WORD PROCESSING SYSTEM

## AVAILABLE FOR FLEX,™ UniFLEX,™ and OS-9™

The STYLOGRAPH text processing system is a very easy to use but powerful method of creating and printing text. It allows the operator to type text on the CoCo, modifying and correcting it as it's typed, and then print it out. The STYLOGRAPH SYSTEM is cursor-oriented with dynamic screen formating. Cursor based editing means that any portion of the text may be worked on by moving the cursor to that point. Dynamic screen formating means that the text is formated on the screen in the same way it will appear on the printed copy. The display is continuously updated to show how the text will appear. This is a very important feature and is normally available only on very expensive commercial word processing systems. It significantly reduces the time required to produce a finished copy.

### FULL FEATURED TEXT EDITING

A full array of commands help in the creation and modification of text. The text displayed on the screen may be moved up, down, left or right. The cursor can be moved to any page or to any specified series of letters or words. The cursor itself can be moved left, right, up, down, to any tab position, or to the extreme left or right. Any block of text can be moved, copied or deleted. The operator may also do a **global replace** so that all occurrences of a given string will be replaced with or without a "prompt" asking if the item should be replaced.

### OPERATOR CONVENIENCE

Files longer than memory can be edited. The operator can move forward through a long text file by selectively dumping text to the disk or filling from the disk.

The supervisor mode is **menu driven** and self prompting so that the operator does not have to remember the syntax of commands. This makes it easier for new operators to use the system.

An "assist" or **"help" function** makes it easy to learn the system since it is normally not necessary to consult the manual to learn the commands. This function is menu driven and lists all of the keyboard functions and the formating commands.

At the beginning of the text the operator normally types in a few simple commands indicating the line length, left margin, and so forth, and then enters the header and footer as they should appear. After that the operator need not worry about formating since it is taken care of automatically. Words that extend beyond the end of the line are automatically removed and placed on the next line. **Headers** and **footers** are automatically inserted so that the operator always knows what portion of the page is being worked on. **Ghost hyphens** can be entered so that if the word falls at the end of a line, and a ghost hyphen has been inserted, the hyphen will automatically be added.

### FLEXIBLE DISPLAY

Lines longer than the screen width are allowed. STYLOGRAPH can scroll right and left on the screen so that tables can be constructed and appear on the screen exactly as they will appear on the print out.

A command allows viewing of the formating commands on the screen. Another command allows the operator to see which characters will be modified at print out by underlining, superscripting or boldface. A page status command shows the current format values and other useful information.

### COMPLETE FORMATING CONTROL

The text of individual lines may be centered, left justified, right justified, or right and left justified. **Tabs** can be set or cleared at any point. Spacing of the lines on the page is under complete operator control with end of page, spacing and vertical tab commands.

While entering text, it may be specified that the characters have some kind of modification when they are printed, such as underlining, superscript, boldface, overline, or subscript. These character modifications are done with "control" key strokes. For example, to start underlining characters, simply hold down the "CTRL" key, hit the "U" key and continue entering text. To stop underlining, hit the "DEL" or "RUB" key.

### POWERFUL PRINTING OPTIONS

Underlining is supported on TTY type printers. For those people who have specialty printers there are a variety of additional capabilities including:

1.5 line spacing
**BOLDFACE**
superscript$^{1}$
subscript$_{2}$
underline, overline,
or any combination

Right and left justification of text is accomplished by incremental printing on TTY type printers. True proportional spacing is supported on the specialty printers.

Control codes may be embedded in the text for special applications. For example, some printers require special control sequences for double width, graphics or boldface. These sequences may be embedded in the text for those users that have these printers. In conjunction with this, it is possible to cause the printer to stop in the middle of a print out for changing printwheels. A backspace feature allows overstriking.

### OPERATING SYSTEM COMPATIBILITY

STYLOGRAPH is compatible with the FLEX, UniFlex, and OS-9 disk operating systems. Text files prepared using STYLOGRAPH are directly usable by other software such as BASIC and the assembler. (This significantly aids software development since cursor-based editing allows full viewing of the text being worked on, thereby reducing errors and decreasing programming time). File size is limited only by the capacity of the disk system. Files may be loaded into the text at any point making it possible to rapidly create "boiler plate" documents using portions of text that have been previously saved to a text file. Any portion of a text may be saved to a text file for use at a later point. The printer output may be directed to a disk file for later print spooling. Most operating system commands are directly accessible without leaving STYLOGRAPH.

### FULLY ADAPTABLE TO MOST PRINTERS

STYLOGRAPH is easily configured by the user for most terminals so there is no need to send for updates as equipment changes are made. Source code of the terminal interface is supplied so that users with unusual equipment configurations may adapt it to their systems. The source code for all of the "prompts" is also supplied so that foreign language versions may be easily constructed.

Printers currently included as standard are: Diablo, Qume, Starwriter, NEC 5515/25, NEC 5510/20; CENTRONICS 737/739; TTY type printer with backspace function; TTY type printer without backspace function.

### COMPLETE INSTRUCTIONS

A special tutorial section is included in the manual so that people with little or no computer experience can easily learn to use STYLOGRAPH in a few hours. A text file is included which demonstrates most of the features of STYLOGRAPH and allows the operator to practice most of the functions. The logical arrangement of the commands and the immediate display of the results greatly simplifies the learning process. In addition there is an "assistance" command which helps the new operator learn the commands.

### STYLOGRAPH MAIL MERGE

A major option of STYLOGRAPH is the related MAIL MERGE program. This program adds "form letter" capability to STYLOGRAPH. Variables such as names addresses, dates, may be taken from a disk file or the keyboard at print out time and inserted into the text. Successive letters may be printed out without operator intervention.

The second important capability of the MAIL MERGE program allows many STYLOGRAPH text files to be appended at print out time. This allows files to be edited in smaller, more convenient blocks and then appended at print out time so that the page numbers will remain consecutive and the headers and footers will automatically be retained through all of the print out.

### STYLOGRAPH SPELLING CHECKER

Another major option of STYLOGRAPH is the related SPELLING CHECKER program. This program reads through a text file and compares the words in the file with a dictionary. Words that are not found in the dictionary may be marked in the text for later editing, corrected on the spot, skipped, or added to the dictionary. Words may be added to or deleted from the dictionary to create unique vocabularies for particular applications.

**STYLOGRAPH for the Color Computer FLEX ..... 195.00**
**STYLOGRAPH MAIL MERGE ..... 125.00**
**STYLOGRAPH SPELLING CHECK ..... 145.00**
**STANDARD FLEX Version ..... 295.00**

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# TEN MOST-ASKED QUESTIONS

# ABOUT DYNACALC™

## THE ELECTRONIC SPREAD-SHEET FOR 6809 COMPUTERS

1. **What is an electronic spread-sheet, anyway?**
   Business people use spread-sheets to organize columns and rows of figures. DYNACALC simulates the operation of a spread-sheet without the mess of paper and pencil. Of course, corrections and changes are a snap. Changing any entered value causes the whole spread-sheet to be re-calculated based on the new constants. This means that you can play, 'what if?' to your heart's content.

2. **Is DYNACALC just for accountants, then?**
   Not at all. DYNACALC can be used for just about any type of job. Not only numbers, but alphanumeric messages can be handled. Engineers and other technical users will love DYNACALC's sixteen-digit math and built-in scientific functions. There's even a built-in sort command, so you could use DYNACALC to manage small data bases - up to 256 records.

3. **What will DYNACALC do for ME?**
   That's a good question. Basically the answer is that DYNACALC will let your computer do just about anything you can imagine. Ask your friends who have VisiCalc, or a similar program, just how useful an electronic spread-sheet program can be for all types of household, business, engineering, and scientific applications.

4. **Do I have to learn computer programming?**
   NO! DYNACALC is designed to be used by non-programmers, but even a Ph.D. in Computer Science can understand it. Built-in HELP messages are provided for quick reference to operating instructions.

5. **Do I have to modify my system to use DYNACALC?**
   Nope. DYNACALC uses any standard 6809 configuration, so you don't have to spend money on another CPU board or waste time learning another operating system.

6. **Will DYNACALC read my existing data files?**
   You bet! DYNACALC has a beautifully simple method of reading and writing data files, so you can communicate both ways with other programs on your system, such as the Text Editor, Text Processor, Sort/Merge, RMS data base system, or other programs written in BASIC, C, PASCAL, FORTRAN, and so on.

7. **How fast is DYNACALC?**
   Very. Except for a few seldom-used commands, DYNACALC is memory-resident, so there is little disk I/O to slow things down. The whole data array (worksheet) is in memory, so access to any point is instantaneous. DYNACALC is 100% 6809 machine code for blistering speed.

8. **Is there a version of DYNACALC for MY system?**
   Probably. You need a 6809 computer (32k minimum) with FLEX or UniFLEX operating system. A version for OS-9 is also in the works. You also need a decent CRT terminal, one with at least 80 characters per line, and direct cursor addressing. If your terminal isn't smart enough for DYNACALC, you probably need a new one anyway. The UniFLEX version of DYNACALC also allows you to mix different brands of terminal on the same system. There's also a special version of DYNACALC for Color Computers equipped with FLEX.

9. **How much does DYNACALC cost?**
   The FLEX versions are just $200 per copy; UniFLEX version $395. Foreign orders add $10 per copy for postage. We encourage dealers to handle DYNACALC, since it's a product that sells instantly upon demonstration. Call or write on your company letterhead for more information.

FRANK HOGG LABORATORY

# ORDER YOUR DYNACALC™ TODAY

CSC

### ALSO FROM FHL

**DYNAMITE +**
**"THE CODE BUSTER"**

**now available for UniFLEX**
**OS-9 version soon**

DYNAMITE + is a new version of DYNAMITE, our popular 6809/6800 disassembler package for 6809 FLEX. Present users of DYNAMITE can upgrade to DYNAMITE + by sending us the original DYNAMITE diskette and $40 (plus $5 for foreign postage). DYNAMITE + does everything DYNAMITE does, and more! A cross-reference generator has been added, label files are now maintained only in text form (LABEL EQU $xxxx), and boundary file specifications have been tremendously simplified, which makes it easier to disassemble large programs containing lots of big tables.

The UniFLEX version of DYNAMITE + does everything the FLEX version does, and also automatically handles system calls and 'info' areas.

DYNAMITE + is available for $100 per copy on FLEX (specify diskette size), and $300 on UniFLEX. Foreign orders add $5 per copy for postage.

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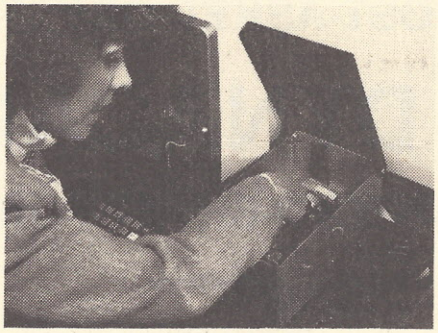
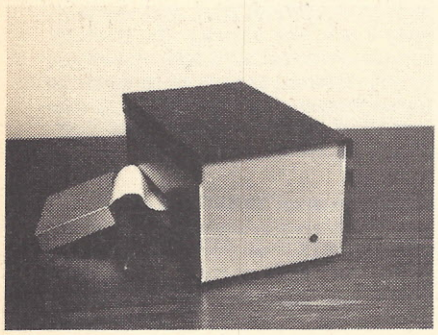
*1. Here is Jeri plugging The Solution into the CoCo. Then she will move the main case up close to the CoCo. The cable is kept short to prevent noise and interference. The disk controller can be plugged into the side slot. The power supply plugs into a socket on the back of the case. All wires for the internal boards exit out the back of the case.*

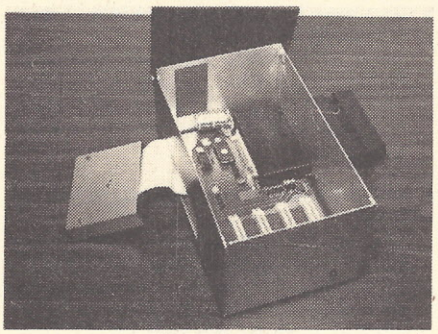


*2. Here Jeri is setting the dip switches in The Solution. The hinged top makes the job easy. The switches can be set for three different things. Up to four boards can be installed inside the case.*

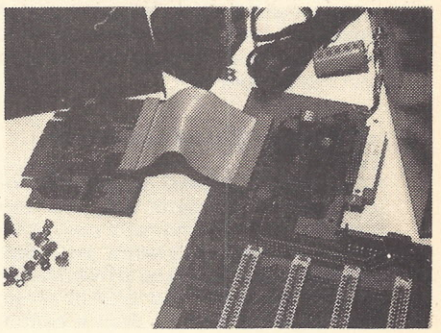
*3. Here is The Solution at work. It makes a very nice addition to your CoCo with a black anodized top and a silver anodized main case both made from heavy aluminum stock.*



*4. Here's The Solution all by itself. The heavy aluminum anodized case is a thing to be proud of. The buffer board can be seen to the left of the main case. The LED indicator on the front comes on when you turn on the power to your CoCo. The Solution needs no on/off switch.*



*5. All that's missing from this picture is the plug in the wall power supply. You can see the 4K EPROM monitor and the 4 position dip switch. At the front are four of the five expansion slots with a disk controller plugged into the fifth slot on the side. The power LED is at the lower right front of the case.*



*6. Here's the real guts to The Solution. We took it all apart so that you could look at the parts. The 1 amp power supply can be seen in this picture. All the connectors are gold as you would expect. The small board is the buffer board. The white connectors are the same as the CoCo's.*

# THE SOLUTION AND WHY WE BUILT IT

When we first introduced FLEX for the CoCo in February 1982 we received hundreds of calls from software and hardware developers who wanted to use the CoCo because it was so inexpensive compared to everything else on the market. However there is not enough expansion or I/O in the CoCo to make this possible for most of these users. I know that the CoCo is viable in most cases, but for many, there needed to be more. So that was the original reason for designing the expansion box we call "THE SOLUTION."

The motherboard has the 2K/4K EPROM socket with a 4K monitor EPROM in it. Also inside are 4 vertical connectors for internally mounted boards or ROM type cartridges. The fifth connector is horizontal and is made for the disk controller, ROM cartridges or additional expansion out the side the of The Solution. A four position dip switch allows for 3 options to be selected. One option will cause the CoCo to get its interrupt and reset vectors from the monitor instead of RS Basic.

If you choose to come up in the monitor, then it is not necessary to have RS Extended Basic in the CoCo to boot FLEX because the monitor has a built-in boot. This saves $100.00 of the cost of The Solution. The power supply is a plug-in-the-wall type with a connector in the back of the case. The back of the case is open and it is thru this that all the cables for the different cards go. This makes for a very neat appearance.

## TECHNICAL SPECIFICATIONS

*Bus Structure...*Fully buffered Color Computer compatible bus. Priority daisy chained arrangement where each slot has a priority assigned to it. The farther out on the bus that you are, the less priority you have. The disk slot (0) has the highest priority with slot 1, 2, 3, and then 4 has the lowest. The pinout and the timing is the same as the Color Computers with the exception of the sound line. This is used on the motherboard for the priority line.

*Power Supply...*The power supply is a tracking power supply which means that the Color Computer itself turns The Solution on and off so that there is no need for an on/off switch. A LED on the front of The Solution indicates when the entire system is on or off. The tracking power supply means that The Solution's bus voltage will be the same as the Color Computers to within a very few minnivolts. The power supply included with The Solution is a 1 amp supply for the 5 volt line only. The +12 and −12 voltages are taken from the Color Computer.

*Dip switch options...*

1) Select the 4K ROM monitor when this option is selected. The system will come up in the monitor and get interrupt vectors from it rather than the Radio Shack Basic ROM. The reason you might want to do this is so you can boot FLEX from the monitor rather than Basic. This will allow running FLEX without having Extended Color Basic in the CoCo. This also ties in with the option on the serial card to come up on a terminal instead of the CoCo TV set and keyboard.

2) Disable the disk slot (0). This will allow using ROM cartidges in The Solution without unplugging the disk card. When the switch is on, the ROM is active. When it is off, whatever ROM cartridge is there is active. This infers that you could switch back and forth between a cartridge and the disk system. This is NOT necessarily true because of the need to initialize the disk software in the ROM and this may destroy what is in memory. It may be possible under special circumstances to do this but it is up to the user to work it out.

3) Select either a 2K or a 4K EPROM. This is set for a 4K EPROM which is included with The Solution. However, it can be changed if you have a need. The EPROM is addressed at $E000.

4) User definable. This means that we didn't use this switch for anything, but you can if you want, or we could call it 'reserved for future expansion.' This means that we don't have any use for it now, but we may in the future.

The Solution I/O cards are addressed at either the $FF60-$FFBF area OR the $FE00-$FEFF area.

These prices and specs are subject to change without notice. Call for confirmation.

**THE SOLUTION** **$249.00**
(Price includes case and power supply.)

CARDS FOR **THE SOLUTION**

**DUAL SERIAL PORT** **$130.00**
Two 6551 ACIAs, programmable baud rates (110-19,200), full RS-232, DB-25 conn.

**CLOCK and PARALLEL PRINTER CARD** **$110.00**
OKI clock w/battery backup and 1 parallel output port

**PROTOTYPE Cards** **$ 37.00**
3½ by 9 inch card

**EPROM/RAM Card** **$ 90.00**
Up to 16K ROM (2732) or 8K static RAM (6116). Each device individually addressed anywhere in memory

**EPROM programmer** **$165.00**
Program 2K, 4K or 8K EPROMS. Software included either on disk or on board ROM.

**TRIPLE PARALLEL I/O Card** **$105.00**
Two 6821's and one 6522 for parallel I/O.

Note: We are considering several other cards for The Solution. Please let us know what you want, if there is enough interest, we will make it.

# FRANK HOGG LABORATORY, INC., IS PROUD TO ANNOUNCE THE ADDITION OF SEVERAL NEW PROGRAMS TO OUR PRODUCT LIST!!

## From Windrush, in England:

**MACE - A 6809 Assembler and Co-resident editor.**

A co-resident EDITOR/ASSEMBLER written by Graham Trott, which takes most of the pain out of assembly language program development. Allows programs to be written, edited, assembled, and de-bugged without ever entering the disk operating system. Includes XMACE, a co-resident 6800/1/3 EDITOR/CROSS/ASSEMBLER.

6809 FLEX only $98.00

**PL/9 - A 6809 compiler with co-resident editor and co-resident trace-debugger.**

A co-resident EDITOR/COMPILER/DEBUGGER written by Graham Trott. A single pass compiler that produces position independent machine code output. Supports many BASIC, SPL/M and PASCAL structures. Supports 8 bit and 16 bit signed AND 32 bit floating point variables. FLEX I/O, floating point, and scientific functions library (w/source) included.

6809 FLEX $198.00

## From Computerware:

**INVENTORY CONTROL FOR RETAILERS & DISTRIBUTORS:**

Designed to help you keep control of this important aspect of your business, this program allows you to store your cost and quantity information, updates it immediately, and offers key management reports with useful summaries at any time upon your request.

CC FLEX version $195.00

**CHECK LEDGER SYSTEM:**

A single entry bookkeeping system which allows the user to define multiple income and expense accounts. Deposits are assigned to income accounts while cash disbursements by check are assigned to expense accounts. Multiple expense assignments may be made for a single check, allowing easy recording of petty cash, credit card payments, etc.

CC FLEX version: $195.00

**GENERAL ACCOUNTS RECEIVABLE SYSTEM:**

Provides reliable and timely information regarding the status of all customers accounts. You can know instantly which acccounts are past due, forecast how much money to expect to receive for cash flow planning, and keep on top of your customer credit position.

CC FLEX version: $149.00

(These business programs are also available for FLEX and OS-9. Please contact us for prices. All of these require Computerware's Random Basic.)

**ACCOUNTS PAYABLE SYSTEM:**

Can give you the tools to plan your business growth by controlling expenditures and forecasting cash requirements. This system helps a small business manage and track its cash liabilities by collecting vendor invoice information and reporting the business cash committments and payment history.

CC FLEX version: $195.00

**PAYROLL PROCESSING SYSTEM:**

Records key information on all employees. Allows for entry of pay rates for standard hours, overtime hours, and salary. Handles hourly, salary, and commissioned employees, as well as, weekly, bi-weekly, semi-monthly, and monthly pay periods. Once all pertinent information is keyed in, processing takes seconds.

CC FLEX version: $295.00

**CORRESPONDENCE SYSTEM:**

The system collects name and address information and then provides mailing labels or reports of the entire list or subgroups within the list upon your request. You can add names, delete names, or change information for a given name at any time, keeping your list accurate at all times.

CC FLEX version: $149.00

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# MAILCALL

Dear Sirs:

I seem to be having trouble loading machine or assembly language programs, do I need any special equipment Please respond in your next issue. There must be a lot of new owners of the Color Computer.

Thank You
E. Papkov
New City, NY

* In order to load machine language programs into your Color Computer you need a program called a monitor and to load assembly language programs you need an assembler. Elsewhere in this issue you'll find an article which includes an assembler, a monitor and a disassembler. Since these programs are written mostly in BASIC you can get started in Assembly language programming quite painlessly.

Editor,

The Medley Computer and Electronics Club has recently expanded to include representation by Color Computer owners. If interested please contact myself (594-2755) or the president Jamie Marriott, c/o MCEC, Canadian Forces Base Cold Lake, Medley, AB, T0A 2M0.
John Plaxton
Medley, AB

* Any other clubs may feel free to use this column to contact prospective members and since we are currently collecting information about clubs include, on a 3x5 index card the following information:
On the upper right hand corner write your two letter state abbreviation and below include the name of the club, contact person, an address, a telephone number (if available), meeting times and meeting locations. These cards will be kept on file so that we may refer people to clubs for help.

Dear Bill,

I have a few comments to give G.W.J.K. Jr. of IRISHMAN SOFTWARE in regards to his steaming letter in the January '83 issue.

No where in the Dennis Kitsz article on the COCO EPROM board does it state that its an easy board to make. Rather he states, "This is a double-sided, compact circuit design, and is not simple to construct. If it is your

FIRST project, DON'T.''

It does not say it is easy to photocopy, rather he says have a professional shop do it.
1) The trace from edge pin 38 should be cut (not pin 37).
2) G.W.J.K. himself is unclear about pins 19 and 20 of the edge connector. Simply connect pin 20 to pin 7 or 2K ROM C and delete the feed through and trace going to pin 8 of 2K ROM C.
3) The 74LS138 is in backwards according to the silkscreen.
4) The fingers are supposed to be on .100'' centers, not .102'' centers.

I am a PC designer and have built many projects. When I saw this layout I knew that it could not be reproduced so I redesigned it allowing for 2732's only.

If G.W.J.K. Jr. had any good sense about printed circuitry he never would have tried such a poor quality reproduction in the first place.

Thanks for a great magazine!
Tom Gunnison
Bloomingdale, IL

* After talking to Dennis Kitsz about the circuit board he informed me that the diagram in 80 Micro was a preliminary drawing and if you will write him about it he'll provide a corrected layout.

Dear Bill,

In re-reading my review of POLARIS as published in the December issue of Color Computer News a glaring inaccuracy screams for attention. Obviously, my brain was well ahead of my fingers when I wrote this review!

Towards the end, I explain that the absence of high resolution graphics is due to the problem of compatibility between Color Basic and Extended Color Basic computers. WRONG!!!!

Machine language programs should run equally as well in either Color Basic or Extended Color Basic unless routines in the Extended ROM are being used in the program itself. Only memory constraints could cause an incompatibility problem. Of course, what I intended to say was to keep the program compatible with the memory requirements of all the Color Computers available the high resolution screens were sacrificed.

I regret any inconvenience this mis-statement may have caused.
Steven Wegert
Ferguson, MO

Editor:

I have a problem with the book written by Alfred Baker, published by Reston Publishing Company of Reston, Virginia under the title ''TRS-80 Programs and Applications for the Color Computer.'' Cost of book $12.95.

Chapter 9 of this book lists a program called ''The Computer Calculator'' which is supposed to do just about any calculation one would ever wish to do. It would certainly be a valuable program if it worked. I have found what I believe to be a printing error in subroutine 61300 where the program says ''GOSUB 600000''. This obviously has one excess zero and should read ''GOSUB 60000.''

The worst problem, however, is that every time I attempt to use any portion of the program which requires the use of subroutines 60000 or 60100 I get a syntax error code. I have several times painstakingly checked my entry of the program into the computer and find no errors in my program as I put it into the computer.

On 22 September 1982 I wrote to Reston Publishing Company about this. A reply stated that they had forwarded my letter to the Author and that I should hear from him. I heard nothing. On November 11 I again wrote to Reston Publishing Company, sending the details of my complaint and asking that it be sent to the author. I have received no further reply from Reston Publishing Company nor from Mr. Baker. This is not much service from the publisher nor the author, is it

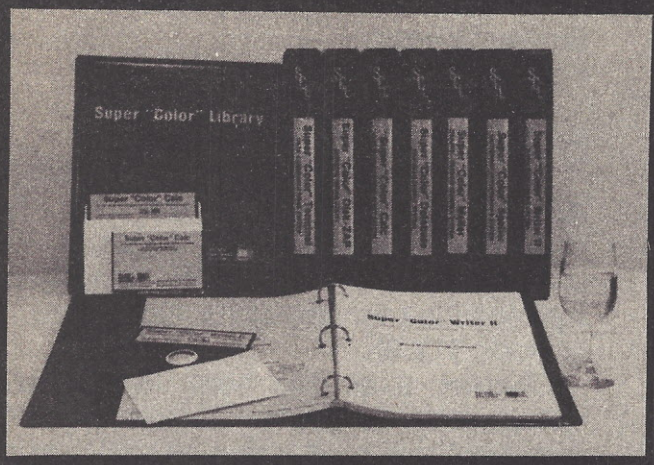
If any of your readers have found the solution to this I would appreciate having the answer which I cannot seem to get from Reston nor Baker.
Sincerely,
Charles L. Redman, Jr.
Fairfax, VA 22030

Dear Charles,

Correct. You have indeed received lousy service, and I am the dirty culprit. For which,

# Super "Color" Library™

## For the TRS-80 Color and TDP System 100 Personal Computers

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*— NEW! —*

64K Compatible

# Super "Color" Writer II™

32x16 & 51-64-85x21 WITH REAL LOWERCASE DISPLAY

## VERSION 3.0 By Tim Nelson

### THE INTELLIGENT WORD PROCESSOR

The **Super "Color" Writer II** is for those who desire the best. It is the most powerful, fastest, most dependable and versatile word processor available for the Color Computer, from 16 to 64K. The **Super "Color" Writer II** has features for the most demanding professional, yet it is easy enough for newcomers to master.

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### Check These Exclusive Features

MEMORY-SENSE adjusts to computer's memory (16-64K) for maximum work space; TYPE-AHEAD, TYPAMATIC KEY REPEAT and KEY BEEP for the pros; 3 PROGRAMMABLE FUNCTIONS: AUTO PHRASE INSERT; COLUMN CREATION; TEXT FILE LINKING; HELP MENU; A TRUE EDITING WINDOW IN ALL 4 DISPLAY MODES; TRUE FORMAT WINDOW to display line lengths up to 255 characters, with horizontal and vertical scrolling to replicate the printed page including centered lines, headers, footers, page breaks, page numbers, margins, giving a perfect printed document every time. Also makes hyphenation a snap; **TRUE AUTOMATIC JUSTIFICATION** for neat, even left and right hand margins; Ability to use CHARACTER CODES for printing special characters available with your printer; freedom to embed as many PRINTER CONTROL CODES as desired anywhere in the text, **EVEN WITHIN JUSTIFIED TEXT;** 90-plus page tutorial manual.

**ADDITIONAL DISK FEATURES:** Read a directory, Display free granules, Save with Automatic Verification, Load and Append ASCII files, and BASIC programs, Kill files, and Link files from disk for continuous printing. 54K bytes of workspace available with a 64 K system. Only the best offers all of these features.

**TAPE $69.95** **ROMPAK $89.95** **DISK $99.95**

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Tape & Disk require 32K for lowercase display
Previous **Super "Color" Writer II** owners call for upgrade policy.

## Super "Color" Mailer™

By Tim Nelson

The **Super "Color" Mailer** is a powerful multi-purpose mailing list merging and sorting program including lowercase display that uses files created by the **Super "Color" Writer II.** Combine files, sort and print mailing lists, print "Boilerplate" documents, automatically insert text in standardized forms, address envelopes, the list is endless.

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NEW

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By Peter A. Stark

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**NELSON SOFTWARE SYSTEMS 9072 Lyndale Avenue So., Minneapolis, Minnesota 55420 612/881-2777**

# 32x16 & 51-64-85x21 Display With Lowercase Descenders And 16 Thru 64K Too!

## NEW Super "Color" Calc™

ELECTRONIC SPREADSHEET By Kevin Herrboldt

Now you can answer those "What if?" financial projection, forecasting, budgeting, engineering and calculating questions with precision, speed and power using the **Super "Color" Calc,** truly the finest electronic worksheet and financial modeling program available for the Color Computer, from 16 to 64K. Now every Color Computer owner has access to a calculating and planning tool rivaling VisiCalc™ containing all its features and commands and then some. You need only change one variable and you instantly see how that change affects your assumptions. You can even use VisiCalc templates freely with **Super "Color" Calc!** Combine spread sheet tables with **Super "Color" Writer II** documents to create ledgers, projections, statistical and financial reports and budgets.

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Tape & Disk require 32K for lowercase display.

## Super "Color" Disk-ZAP™

By Tim Nelson

Now the dreamed-of repair of I/0 errors is a reality. The **Super "Color" Disk-ZAP™** is the ultimate repair utility for simple and quick repair of all repairable disk errors. Designed with the non-programmer in mind, the **Super "Color" Disk-ZAP™** will let you retrieve all types of bashed files, including BASIC and Machine Code programs.

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**THE FINEST TERMINAL PROGRAM ANYWHERE!**

**Version 3.0 By Dan Nelson**

The best has become even better, with many new features including 4 display formats; 32x16 & 51-64-85x21 with real lowercase descenders, plus compatibility with the 64K Color Computer. This user-friendly program makes communicating with ANY computer a breeze even for a newcomer. Communicate using your modem with all the popular information services such as Dow Jones, Compuserve, The Source, and local BBS's, clubs, friends, or the main-frame at work. You can also communicate directly with other microcomputers, such as the TRS-80 I/III, II, other Color Computers, Apples, IBM PCs, etc., via RS-232 without using a modem. Save the information or PRINT IT!

**FEATURES:** MEMORY-SENSE to adjust to computer's memory (16-64K) for maximum work space; Selectively print data at baud rates from 110 to 9600 * 60K of data storage with 64K disk system. 128 character ASCII keyboard * Automatic graphics mode * Word mode (word wrap) for unbroken words * Send & receive **Super "Color" Writer II, Database & Calc** files, ASCII files, Machine Language & BASIC programs * Set communications baud rate from 110 to 9600, Duplex: Half/Full/Echo, Word length: 5 6 7 or 8, Parity: Odd/Even or None, Stop Bits: 1-9 * Local linefeeds to screen * Save and load ASCII files, Machine Code & BASIC programs * Unique CLONE feature for copying any tape * Lower case masking * 10 Keystroke Multiplier (MACRO) buffers to perform repetitive pre-entry log-on tasks and send short messages * Programmable prompt or delay for send next line * Selectable character trapping * Files compatible with other Library programs,

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Previous **Super "Color" Terminal** owners call for upgrade policy.

## NEW Super "Color" Database™

By Dan Nelson

This high speed machine language program including true lowercase displays fills all your information management needs, be they for your business or home. Inventory, accounts, mailing, lists, family histories, you name it, the **Super "Color" Database** will keep track of all your data.

The **Super "Color" Database** features MEMORY-SENSE to adjust to computer's memory (16-64K) for maximum work space. It is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design, each divided into as many fields as you need. All files are fully indexed for speed and efficiency. Full sort of records is provided for easy listing of names, figures, addresses, etc., in ascending or descending order. The math package performs arithmetic operations and updates other fields which is especially useful when used as an order entry and invoicing system. You can create reports, or lists for mailings, or whatever. Create files compatible with the **Super "Color" Writer II and Terminal.** Up to five different print formats are available, and control codes may be imbedded for customized printing.

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*WE TAKE THE COLOR COMPUTER SERIOUSLY.*
**AUTHORS' SUBMISSIONS ARE ENCOURAGED.**

I sincerely apologize. In searching, I found your original letter in my file, as if it were processed, but with no note to that effect. Ah well.

As to your problems. One of the great lessons Reston learned with my book is DON'T TYPESET LISTINGS. Print them as produced by the computer. I studied them for MANY hours prior to the print run, and I am still finding errors. That extra zero at the beginning of the fifth line of statement 61300 on page 125 is one I hadn't found. Thanks.

As for the two syntax errors, one of the little known problems with Microsoft Basic is that a space must be placed between a variable name and a succeeding keyword. ''IFX=ATHEN100'' is a syntax error. ''IFX=A THEN100'' is the proper statement. Therefore, place a space in line 60000 between the XX=X and the THEN; and place a space between the XY PI and the THEN in line 60100.

But don't, instead use the enclosed tape. It has three copies of the program, all identical and guaranteed to work. Since you have put up with the typo's in one program, I won't put you through the trouble of finding the other three or four in the book. You will also find enclosed a Color Computer Disk containing working versions of all the programs. If you don't have a disk yet, find a friend at your local Radio Shack computer store and get him to let you use his to make tape copies.

Again, sorry for the inconvenience. Enjoy your computer.
Sincerely,
Al Baker

Dear Color Computer News,

I have been a subscriber to your magazine for about five months now, and I am very pleased with it. I wish I had known of your magazine before I let Radio Shack perform my 32K upgrade, as it would have saved me some money. Anyway, let me get to the purpose of this letter. The program and article titled ''GRAFTEXT'' by Jerry L. Ginn is a very interesting treament of text characters on the hi-res graphics screen. The accompanying listing shows some modifications that I came up with which I feel improves on the author's very good ideas. The changes I made are contained in lines 5,

7, 8, 13 and 38 and are as follows. The author stated in the article that a possible improvement might be made by avoiding the "GET" in line 5. I accomplished this by using the "VARPTR" for the array, and "POKE"ing the data directly into the array. This resulted in about a 12% improvement in print speed over the original program.

The changes in lines 7 and 8 allow the back arrow to be used on a line of keyboard entry which wraps around a screen line. This avoids the FC error which could occur with the original lines 7 and 8. It also should be pointed out that once the program has been run to "compile" the data into line 1 and 2, the "RENUM" function may not be used on the program, or lines 1 and 2 will be destroyed. This is corrected by changing line 5 to subtract 32 from the extracted value, and changing line 13 to add 32 to the value in the "DATA" statements. This will cause all characters stored in the "REM" statements at line 1 and 2 to be in the range of 32-63, which BASIC will not try to tokenize. Line 38 was changed to give a better representation of the ampersand character (&). One other note of interest. I have noticed several letters referring to decimal to hex and hex to decimal conversion. The Color Computer will perform these functions for you (EXTENDED BASIC) by using the "HEX$(xxxx)" and '&Hnnn" functions in a print statement. This will work for numbers from 0 to 65535 (hex 0000 to FFFF).

Thanks for a fine magazine, and keep 'em coming.

Sincerely,
Dick Whiteley
Nashville, TN

## GRAFTEXT

```
1 ' XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXX
2 ' XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXXXXXXXXXX
  XXXXXXXX
3 X6=6
  :DIM V(0)
  :X1=256*PEEK(25)+6+PEEK(26)
  :GOTO 9
4 X2=X6
5 FOR X3=0 TO LEN(TX$)-1
  :X4=ASC(MID$(TX$,X3+1,1))-
  32
  :X4=5*X4+X1-7*(X4>31)
  :FOR X5=0 TO 4
  :POKE VARPTR(V(0))+X5,255-
  (PEEK(X4+X5)-32)*8
  :NEXT
  :PUT(X+X3*(X6-X2),Y+X3*X2)-
  (X+7+X3*(X6-X2),Y+4+X3*X2),
  V,PSET
  :NEXT
  :X2=0
  :RETURN
6 TX$=INKEY$
  :R$=""
  :SOUND 200,1
7 PUT(X,Y)-(X+4,Y+4),V, NOT
  :TX$=INKEY$
  :IF TX$=""
  THEN 7
  ELSE A=ASC(TX$)
  :IF A>31
  THEN R$=R$+TX$
  :GOSUB 5
  :X=X+X6
  :GOTO 8
  ELSE TX$=" "
  :GOSUB 5
  :IF A=8 AND LEN(R$)
  THEN X=X-X6
  :R$=LEFT$(R$,LEN(R$)-1)
  :IF X<0
  THEN X=INT(250/X6)*X6
  :Y=Y-X6
  :GOSUB 5
  ELSE GOSUB 5
8 IF A=13
  THEN RETURN
  ELSE IF X>250
```

```
  THEN X=0
  :Y=Y+X6
  :GOTO 7
  ELSE GOTO 7
 9 ' * * * * PGM
   BEGINS * * *
   *
10 PMODE 4,1
  :COLOR 0,1
  :PCLS
  :SCREEN 1,0
11 FOR N=1 TO 5*64
12 READ DB
13 POKE X1+N-1-7*(N>160),DB+32
14 NEXT
15 FOR N=32 TO 63
16 TX$=TX$+CHR$(N)
17 NEXT
18 Y=12
19 GOSUB 5
20 FOR N=64 TO 95
21 TT$=TT$+CHR$(N)
22 NEXT
```

GRAFTEXT

```
23 TX$=TT$
24 Y=Y+X6
25 GOSUB 5
32 DATA 0,0,0,0,0
33 DATA 6,6,6,0,6
34 DATA 10,10,10,0,0
35 DATA 10,27,0,27,10
36 DATA 15,20,14,5,30
37 DATA 25,26,4,11,19
38 DATA 4,10,4,9,7
39 DATA 6,6,6,0,0
40 DATA 2,4,4,4,2
41 DATA 8,4,4,4,8
42 DATA 0,10,4,10,0
43 DATA 4,4,31,4,4
44 DATA 0,0,6,6,2
45 DATA 0,0,31,0,0
46 DATA 0,0,0,6,6
47 DATA 1,2,4,8,16
48 DATA 14,17,17,17,14
49 DATA 4,12,4,4,14
50 DATA 14,17,2,4,31
51 DATA 14,17,2,17,14
52 DATA 2,6,10,31,2
53 DATA 30,16,30,1,30
54 DATA 14,16,30,17,14
55 DATA 31,2,4,8,16
56 DATA 14,17,14,17,14
57 DATA 14,17,15,1,14
58 DATA 6,6,0,6,6
59 DATA 6,6,0,2,4
60 DATA 2,4,8,4,2
61 DATA 0,31,0,31,0
62 DATA 8,4,2,4,8
63 DATA 14,1,14,0,12
64 DATA 14,17,17,23,23
65 DATA 14,17,17,31,17
66 DATA 30,9,14,9,30
67 DATA 14,17,16,17,14
68 DATA 30,9,9,9,30
69 DATA 31,16,30,16,31
70 DATA 31,16,30,16,16
71 DATA 15,16,23,17,15
72 DATA 17,17,31,17,17
73 DATA 14,4,4,4,14
74 DATA 7,2,2,18,12
75 DATA 17,18,20,18,17
76 DATA 16,16,16,16,31
77 DATA 17,27,21,17,17
78 DATA 17,25,21,19,17
79 DATA 31,17,17,17,31
80 DATA 30,17,30,16,16
81 DATA 14,17,21,18,13
82 DATA 30,17,30,18,17
83 DATA 15,16,14,1,30
84 DATA 31,4,4,4,4
85 DATA 17,17,17,17,14
86 DATA 17,17,17,10,14
87 DATA 17,17,21,27,17
88 DATA 17,10,4,10,17
89 DATA 17,17,10,4,4
90 DATA 31,2,4,8,31
91 DATA 14,8,8,8,14
92 DATA 16,8,4,2,1
93 DATA 14,2,2,2,14
94 DATA 4,14,21,4,4
95 DATA 4,8,31,8,4
100 Y=24:GOSUB 6
```

Mr. Sias:

Congratulations on your fine publication in support of the Color Computer. I feel as though I've already received more than the cost of my subscription with the first three issues.

I took the liberty to order the available back issues for 1982, but am still missing three of them. They are January 1982 (5), May 1982 (9), and June 1982 (10).

Do you have any plans to reprint these particular issues singularly prior to an effor similar to that done with the 1981 issues If not, would any subscribers in the St. Louis area please contact me at (618) 281-7346, or 1062 N. Briegel, Columbia IL 62236, for a short-term loan.

Cordially,
Archie S. Keiper
Columbia, IL

* First of all May and June are the same issues so if your missing number 10 its August. Secondly, I don't intend to reprint missing issues or to do another back issue book, however its possible that we will produce some books containing some of the articles contained in back issues by topic.

To the Editor,

While it may or may not be violation of editorial policy, I urge you to print this letter. It is a brief review of my personal experience with a software vendor that is worth printing.

The vendor is STAR-KITS, MT. KISCO, NY. Several months ago I purchase "Newtalk" from STAR-KITS. At a price tag of $20.00 it was one of the best software investments I have made. Last week I received my copy of "STAR-DOS". My purpose here is not to review the product, but the company.

This is not the "mutual admiration society", I am simply thrilled with the business attitudes of Peter Stark. First of all I received my product WITHIN 10 days, having paid by personal check. Second, the software arrived well protected in a box, in a ziplock bag. Third the documentation is excellent and professional. Fourth, the Source code for NEWTALK was included with the program! Fifth, the disk arrives unprotected so that backups are easy.

When I received "STAR-DOS" I was unclear on certain aspects of it's implementation. I called STAR-KITS and suddenly found myself speaking with Mr. Stark. He not only answered my questions thoroughly, patiently and POLITELY, but he even said I could return the program for a refund or exchange if I wished. The only stipulation was that I include an informal affidavit saying that I hadn't copied the program.

I think that the software houses are at the mercy of the buying public. The ones that are indecent and take advantage of the mailorder method of sales as a means of fraud ought to be punished by boycotting their products. On the other side of the coin, companies that go out of their way to help their clientele ought to be awarded. I hope that the reader will consider a purchase from STAR-KITS in the future. Its a good product and a good investment.

Sincerely,
Donald Siwek
Peabody, MA

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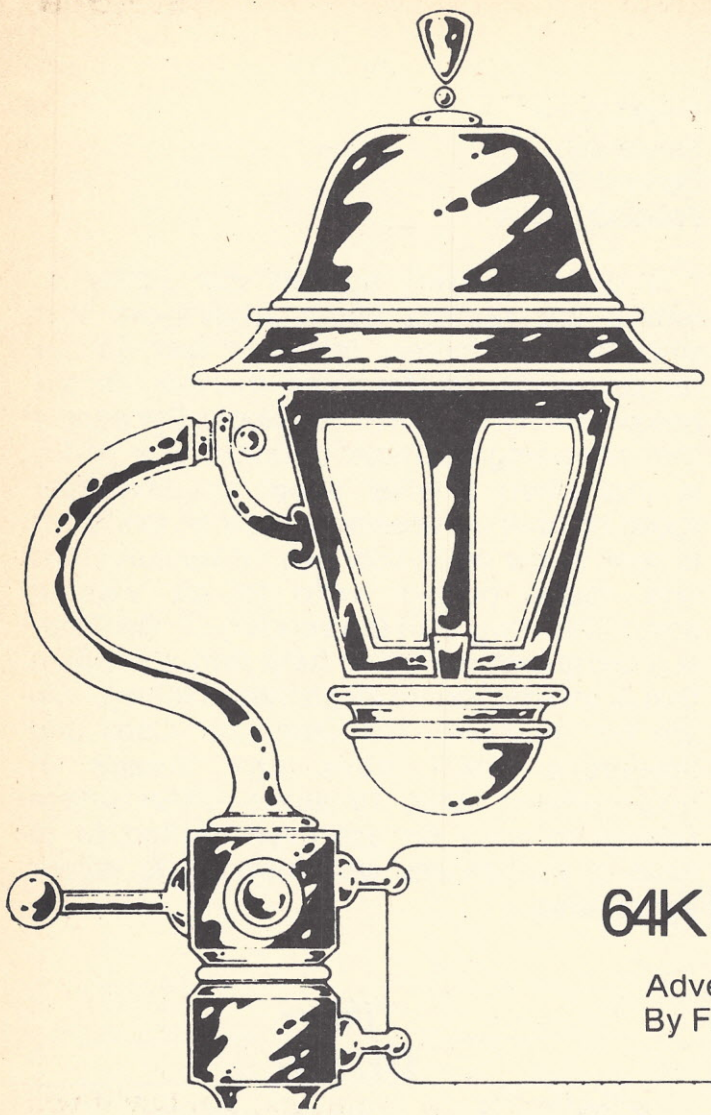

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## MORE ON MOVEROM
## DISK DRIVE INFORMATION

### CATALOG

The January catalog worked out so well that we decided to do it again this month. Look in the center of this issue of Color Computer News and you will find our 32 page Spring catalog full of goodies for the Color Computer and other 6809 based computers. We have several new products in this catalog, so be sure to give it the once over. We also repeated the 64K columns and brought them up to date. We had to leave some things out to make room for the new stuff. Looks like next time we'll have to go to 64 pages to fit it all in.

### MOVEROM REVISITED

MOVEROM is a program that was printed in the March '82 issue of Color Computer News. It was supposed to be free to anyone who wanted to use it. Last month I found out that another company was selling the program or one that did the same thing, and that irritated me. MOVEROM is too simple a program to pay for. It should be just general information for all users. To that end, I have decided to print it again, but with a copyright notice this time to prevent its resale. You can copy it, give it to your friends, or print it in your club newsletter, but the copyright notice must be included with it and it can not be used by anyone as a commercial product or part of one. Nuff said, here it is in assembly language.

```
* Copyright 1983 by Frank Hogg
* Permission to use is given for all bu
* commercial use.
```

```
                    *
1A   50             ORCC    #$50     DISABLE INTERRUPTS
BE   8000           LDX     #$8000   FIRST ADDRESS
          MOVE
B7   FFDE           STA     $FFDE    SWITCH PAGE
A6   80             LDA     ,X+      GET BYTE FROM ROM TO MOVE
B7   FFDF           STA     $FFDF    SWITCH PAGE
A7   1F             STA     -1,X     STORE BYTE IN RAM
8C   E000           CMPX    #$E000   SEE IF DONE
25   F1             BLO     MOVE2
39                  RTS
```

## ALL DONE - RETURN TO BASIC IN RAM

Here is the BASIC program to do the same thing.

```
1 ' Copyright 1983 by Frank Hogg Permission to use is
2 ' given for all but commercial use.
10 CLEAR 999
20 DATA  26,80,190,128,0,183,255,222,166,128
30 DATA  183,255,223,167,31,140,224,0,37,241,57
40 FOR I=1 TO 21:READ A:A$=A$+CHR$(A):NEXT I
50 P=VARPTR(A$)+1
60 POKE P,126
70 EXEC P
80 PRINT "NOW IN RAM!"
```

You can verify that you are in RAM by PEEKing and POKEing around in memory like so;

```
? PEEK(&HE000)
 167
OK
POKE &HE000,0
OK
? PEEK(&HE000)
 0
OK
```

You now have 8K (almost) from $E000 to $FEFF to play with, so have fun. You can also change things in Basic.

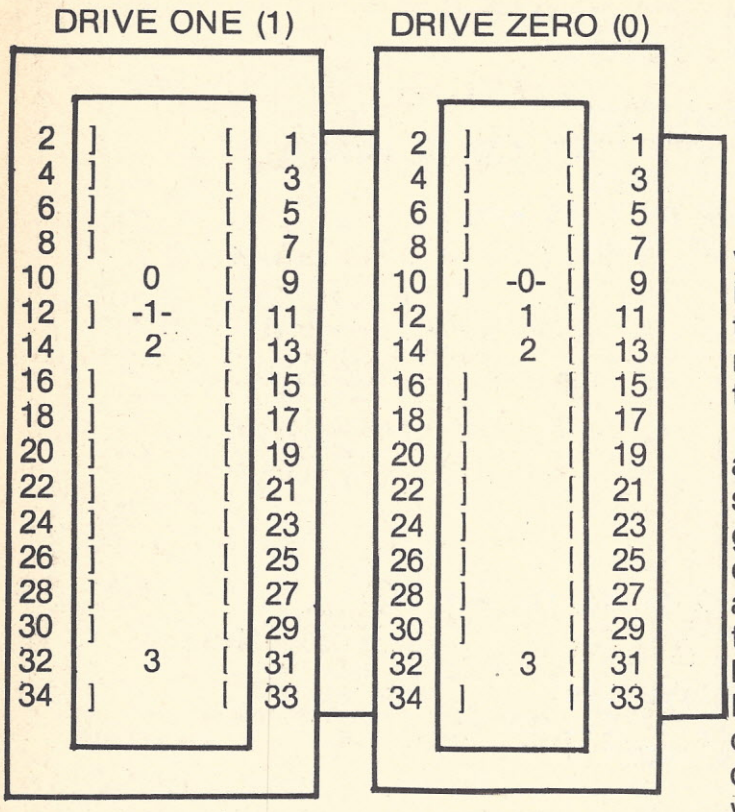
## DISK DRIVE INFORMATION

How can I hood up a non-Radio Shack drive to my Color Computer?

Several companies, including FHL, sell other brands of disk drives for the Color Computer. However, because these drives are already set up for the Color Computer, they cost more than what you can buy if you shop around for a good deal. The problem is that these good deals sometimes don't give you the information to hook the drive to your Color Computer, so here is how to do it.

First let's look at the cable. Radio Shack uses the cable connector to decide which drive is which. The connector closest to the controller is drive 0 and the next is 1 etc. If you have a cable handy, look into the open end of one of the drive connectors. Notice that some of the pins are missing on one side of the connector. The other side is all ground connectors so if some of them are missing it doesn't matter. You will notice 3 missing pins out of a possible four. The pin that is there is the one that selects that drive.

This is what the drive connector looks like for a single sided RS type drive. The connector for the controller end has all the pins in it.




For drive zero, pins 12, 14 and 32 would be missing. This means that pin 10 is drive 0 select and pin 12 is drive 1 select. In like manner pin 14 is drive 2 select and pin 32 is drive 3 select. The reason that pin 32 is off to the end of the connector is that it is actually the side select line from the controller. For double sided drives to work at all this pin has to be there and that is also why you can only have a max of 3 drives when you want even one of the drives to be double sided.

Double sided drives are easy to set up. Because you can only have 3 drives max, all you need do is set the jumper block in the drive to select 0, 1, 2 all the time. On drives that have a head load solenoid (MPI, TEAC) set HM on and leave HS off.

Now let's look at the simple single sided drive. If you have a RS cable all you have to do is set the select jumper for the drive to be all on. Except for drive 3. The drive 3 select line from the Color Computer is actually the side select line from the controller. RS uses this to select drive 3. If you are not going to use the drive as number 3 don't worry about it, but if you are, you have to put a jumper from the side select line to drive 3 select. This is done on the disk board by a small jumper and a trace cut if needed. You will have to get the information from the place you bought the drives. We don't provide that information because we don't have it for all the different drives available. It is not necessary if you are not planning to use more than 3 drives.

Perhaps the easiest way would be to lease all the pins in the cable and use the drive select jumper on the drive board. Be sure to get this information when you buy your drives, because without it you will not be able to get the drives running. Sometimes there is a legend printed next to the jumper block with things like D0, D1, D2, D3, MX, HM etc. D0 or sometimes DS0 is obviously drive 0 select. HM is head load with motor on. This should be used with MPI drives, as we found them to be more reliable this way. Tandon drives do not have a head load solenoid so that doesn't matter with them. HS is head load with select. Leave this open on the MPI. You can only have one of the 2, not both at the same time. I have only used Tandon, MPI and TEAC drives with the Color Computer. They all work fine but that doesn't mean others won't work as well. You are on your own from here on out. Be careful that you buy your drives from a reputable dealer who will help you get them running if you can't. I am giving you all the information that I have here so that I won't get any more calls from people trying to hook up bargain drives to the Color Computer. The best advise is this.

Know what you are doing. Deal with a reputable dealer. Get documentation (service manuals). If you don't know what you are doing then pay the extra buck to buy drives already set up. Remember that a bargain is only a bargain if it works.

You can save money on drives if you know what you are doing and are careful about who you buy from. If you are not sure of yourself then buy one drive already set up so that you can use it as an example to set up other.

That's it for this month.

Frank

# IF YOU OWN A COLOR COMPUTER

# THEN YOU NEED

# THE COLOR COMPUTER TOOLKITS

The software development tools that let you put even more POWER into the already super powerful COLOR COMPUTER. They're full of tools, aids, bells and whistles useful to the BASIC/MACHINE CODE programmer, in friendly, easy to use software packages.

All tools are in the COLORKIT; * tools not in the MICROKIT.

- . LIGHT Characters on DARK Background with CURRENT LINE HIGH-LIGHTING ; or Normal Dark Characters
- . FULL SCREEN EDITOR with: Arrow Key controlled Cursor ; open up space / delete and close up space
- . Enabling selective line RENUMber / COPY / MOVE / MERGE ; or use Normal EXT. BASIC's line editor
- . PROTECT the current BASIC Program from being wiped out by CLOAD, NEW, etc; or from being LISTed.
- . RESTORE a protected BASIC program / APPEND any number of BASIC programs together easily
- . KLICK on Keypress ; or Normal Silent Keys ( Klick Tone modifiable by use of SOUNDn,n Command )
- . GLOBAL SEARCH of COMMAND or TEXT strings in BASIC programs, with WILDCARD character and NEXT "."
- . 9 SCREEN PRINT DELAY's with keyboard override ( for slow READABLE LISTing's / DISK Directories! )
- . VARIABLE NAME LIST / String-Byte Memory Usage / Range of FREE MEM / Top of Memory Address Display
- . FAST Machine Code to BASIC DATA Statement CONVERTER for storing Machine Code visibly in BASIC
- . (C)SAVEM Address / Backup Tool (Last Filename, Start, End, Execute)
- . Recovery of LOST BASIC Programs after NEW, BACKUP, DSKINI, etc
- . BREAK KEY DISABLE / ENABLE ( Pause keys still available )
- . Modified TRON Display ( .LN. replaces [LN] )

- *. MERGE BASIC with Machine Code Routines so Machine Code "invisible" & (C)SAVE/(C)LOADable
- *. 9 BASIC RUN DELAY's with keyboard override ; SINGLE STEP(S) Mode with Current Line Number display
- *. MEMORY EXAMINE / MODIFY with HEX / ASCII / DEC / DOUBLE DECIMAL output and HEX / ASCII input
- *. Memory BLOCK-MOVE for relocating Machine Code Programs, DATA blocks, etc ; or the KIT itself
- *. TEN USER DEFINED FUNCTION KEYS accessible with <@> ; <NUMBER> ( BASIC MACRO's / Block Storage )
- *. Automatic Linefeed for Printer's that don't / double space LISTings, or Normal PRINT
- *. DELETE all Spaces ( not in PRINT Strings, DATA or REMARK Lines )
- *. ASCII / HEX Memory DUMPS to Screen or Printer
- *. DELETE all REMARK's ( either REM or ' type )
- *. Parallel ECHO of Screen Output to Printer

- . TRANSPARENT to the User, Install it and forget about it until you need it
- . BASIC Runs up to 1/3 FASTER through the Toolkit (5-10% typical)
- . HELP Command Lists all Kit Commands and Current Kit Address
- . Same Program works on TAPE and / or DISK and in 16 / 32 K
- . Entire System Totally REMOVABLE anytime
- . COMPATIBLE with other Utility Packages
- . Green / Orange Text Screen Capability
- . Easily MODIFIABLE Command Syntax

THE KIT's are RELOCATABLE programs that load anytime without bothering your BASIC program or variables or top of memory address. All the tools may be turned on and off at will including the KIT itself.

The tools are available with simple 3 or 4 letter commands entered in direct mode, with the entire instruction set viewable by use of the .HELP command:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| .VAR | .OLD | .MMRG | .MPRG | .BRON | .BROF | .SCON | .SCOF | .KLON | .KLOF | .BROF | .DARK |
| .LITE | .PROT | .REST | .TXON | .TXOF | .RDLY | .PDLY | .DELR | .DELS | .SNLF | .DBLF | .DUMP |
| .MEM | .BYE | .BLOC | .ECON | .ECOF | .MADD | .FNIN | .HELP | .GBL | .(next) | | |

The COLORKIT is 5 K-bytes with all the tools for $29.95
The MICROKIT is 2.5 K-bytes minus * tools for $27.95
On DISK with handy BASIC KIT loader for additional $5.00

**********

THE GOOD LIFE $16.95
The CLASSIC Game of LIFE, with:

- . 64 x 64 4-COLOR symmetrical display (GIC)
- . 3 Selectable Birth and Old Age Colors
- . 15 Modifiable Pre-programmed Patterns
- . Save/Load Life Screens to Tape/Disk
- . Speeds from 8 gen/sec to 1 a second
- . JOYSTICK and / or ARROW Key Input
- . Written in User Modifiable Basic
- . With Machine Code LIFE processer
- . HELP Screen Command List
- . Tape / Disk Compatible
- . Selectable Color Sets
- . X & Y Axis Wraparound

THE DISK COMMANDER $19.95
DISK FILE UTILITY with:

- . Single Key VIEW / COPY / LOAD(M) of Files
- . Double Key KILL / RENAME of Files
- . SORT DIRECTORY on Name / Extension
- . PACK DIRECTORY so new files put at end
- . DIRECTORY KEYWORD SEARCH of Filenames
- . PRINT DIR w/ MACHINE CODE addresses
- . RECOVER KILLed Files

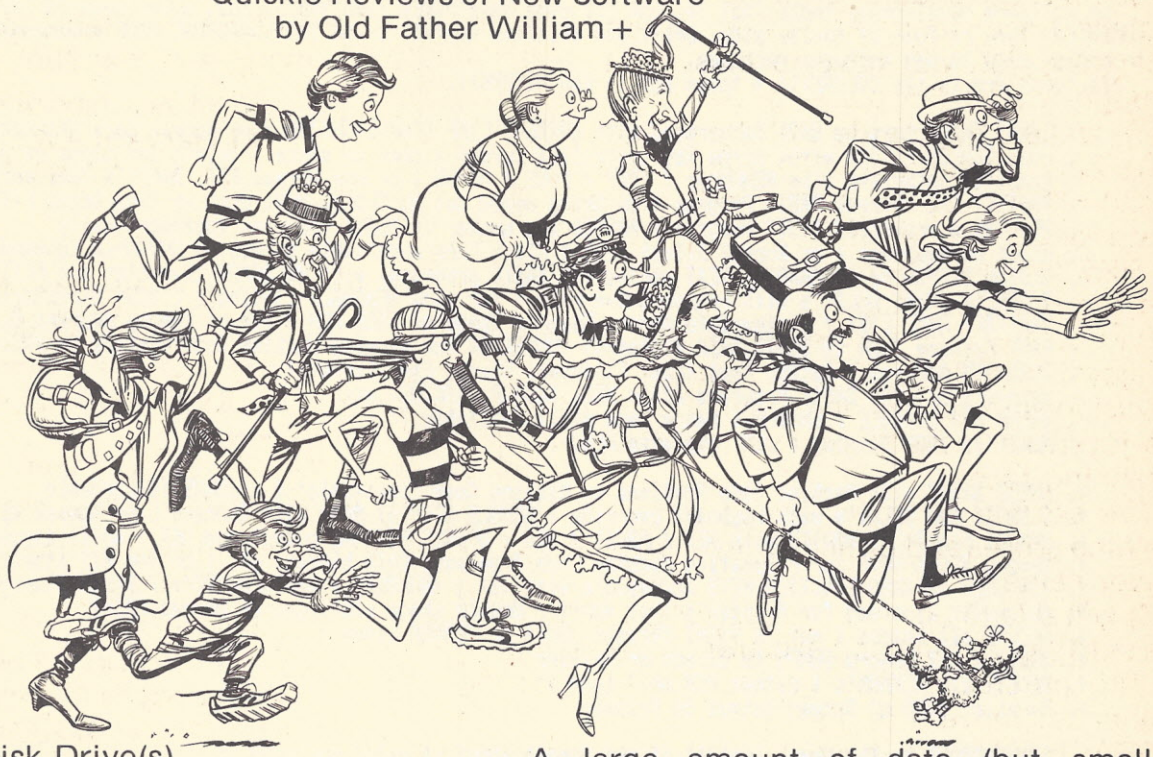
DEER HUNT $15.95

- . ARCADE Shoot-em-up SKILL Game
- . Aim for ONLY the DEER
- . Avoid hitting people, cars, train
- . Will NOT Cause Tension Headaches
- . BASIC / Machine Code Hybrid
- . Tape / Disk Compatible

ARIZIN INC.
P. O. BOX 8825
SCOTTSDALE, ARIZONA 85252

# PRO-COLOR-FILE

from Derringer Software
PO Box 5300
Florence, SC 29501
(803) 665-0314
Quickie Reviews of New Software
by Old Father William +



32K CC with Disk Drive(s)
Disk only 2 versions:
1.0 - $59.95; 2.0 - $79.95

Enter, store, search, update, display, and print out all or selected items of data. PRO-COLOR-FILE does it all, and with a PROfessional flair. Not one program but several, all on one disk, PCF gives maximum flexibility as well as maximum memory usage, by quickly loading only the portions of the total program currently needed for the processes being performed.

PCF handles equally well numerical data that needs to be manipulated by equations (from simple adding and totaling to complicated formulas), alphabetical data which needs to be indexed (alphabetized, zip-code ordered, etc.), and combinations of both kinds of data and handling. Give it almost anything and it can organize it and report back.

The user can start with (or add along the way) up to 60 alphabetical or numerical ''fields'' for each ''record''. As an example, imagine items like name, address, notations, orders, payments, etc. (fields) for each customer (record). All that for as many as 750 records per data disk.

A large amount of data (but small, compared to the capacity of the program) may reside on a backup copy of the PRO-COLOR-FILE disk in drive 0, and persons with only one disk drive can process it. Overflow that, and PCF easily reminds you to switch (not often) from ''system'' disk to ''data'' disk when the user changes procedures. If the user has more than one drive, PCF lets you tell it where to look for which items of data, and all is automatic from there on.

Used at home or at the office, the program needs only the person who designs the format of up to four display screens and up to five different report formats to be familiar with all the details in the excellent manual. Others may do the entering, updating, and calling up of reports of data without all the detailed knowledge of how the program works.

Owners of Version 1.0 may upgrade to 2.0 for just the $20.00 difference in price. A few Version 1.0 disks are still available at the old price, with upgrade available later.

I expect to get a full review of this system ready for next month's Color Computer News, with a complete description of the new 2.0 features and manual.

# SPACE RACE

by Jeffrey Stipes
1674 Lawnel Avenue
Muskegon, MI 49441

This new Arcade Game from SPECTRAL ASSOCIATES should bring a smile to all 'Omega Race' fans. As you fly around the race track you will have to blast your way through Mines (25 pts.) ad Collectors (200 pts.), while doing battle with Swarmers (400 pts.) and Berserkers (600 pts. these are nasty). There are 16 skill levels and extra space ships for each 10,000 points. The HI-RES GRAPHICS movement is excellent, and the sound is good.

Particularly nice is the option of keyboard or joystick play. The keyboard offers precision ship control and tactical play while the joysticks make a riotous, whirling and careening race.

The scoring billboard keeps track of the top nine scores and difficulty level of each by player name.

Spectral is to be commended for providing the starting, ending and executing addresses so the purchaser may back-up this super product or move it to disk.

SPACE RACE is machine language, runs in 16K and is for the TRS-80, TDP-100 and Dragon Data.

SPACE RACE is available for $21.95 (plus $1.00 shipping and handling) on cassette from:

Spectral Associates
141 Harvard Avenue
Tacoma, WA 98466

# PRO-COLOR-FILE©

***If you're through playing games and are ready to get serious about software, then PRO-COLOR-FILE is for you. Turn your TRS-80 32k Color Computer Disk System into a powerful data base manager.***

## 60 DATA FIELDS

These fields are defined by you along with how many spaces to allow for data entry and are broken into 4 segments of 15 fields each. Define from 1 to 15 fields per segment and indicate separate disk drives for segments if you have them.

## 4 DATA ENTRY SCREENS

Don't bother with PRINT @ statements anymore. PRO-COLOR-FILE lets you custom design your screens that will be used for entering your data with full color. Type headings, notes and titles to suit your needs and specify your fields as being alphanumeric, whole number, or decimal entry. Switch through screens while entering data or reviewing records. You can even define a password for any screen for limited access.

## 14 MATH EQUATIONS

Set up math equations to apply the operations of add, subtract, multiply, or divide to the data you enter on each record. In a Job Quote program you could set up the equations to multiply the hourly rate by the number of hours, add all the expenses together and then apply sales tax.

## ALPHABETIZED INDEX

An index will allow you to scan through your file or obtain a hard copy report in an alphabetical order by any of your fields. An index will also allow access to any record within a 1000 record file in less than 10 seconds. Tag up to 2 additional fields to create an index within an index within an index. This means that you could alphabetize a mailing list first by STATE then within each STATE by CITY and then within each CITY by LAST NAME.

Select records for indexing by using AND/OR options and relationship indicators such as =, <, >, < =, > =, < >.

Re-Index a file at any time when new records are added or when a different index is desired.

## 5 REPORT FORMATS

PRO-COLOR-FILE gives you the freedom to design report formats that will produce hard copy reports of your data formatted to your needs. The versatile report formatter will let you design report formats with column width selectable from 32 to 255 spaces. Indicate up to 5 ASCII codes to be sent to the printer to take advantage of different font sizes on printers with that capability. Define report title and column headings, create vertical lines, obtain totals on numeric fields and even design label formats.

Select records for reporting from the index list by using the same AND/OR options and relationship indicators as mentioned.

A custom menu lets you name each report format to indicate the type of report it will generate. Password protect any format to allow limited access.

## NEW VERSION - 2.0

PRO-COLOR-FILE 2.0 has added features that offer even more flexibility and added Data management capabilities.

## SCREEN REPORT FORMATS

If you need to review records and/or obtain totals for numeric fields without wanting to produce a hard copy, you will be able to do so with the screen report feature.

## ASCENDING / DESCENDING

Have your hard copy or soft copy reports printed out in ascending or descending order.

## SELECT A RANGE

PRO-COLOR-FILE 2.0 gives you the ability to select a range of records for indexing or reporting by two fields at the same time. In a mailing list program you could select only those records that fall within a certain zip code range and that have last names within a certain range of the alphabet.

---

Design as many programs as you can think of: Mailing List, Inventory, Job Quotes, Expenses, Student Records. Any application that requires information to be stored, updated and reported can be created with PRO-COLOR-FILE. Fully documented with examples of data base programs created using PRO-COLOR-FILE.

**VERSION 1.0 - $59.95** (limited copies available)

**VERSION 2.0 - $79.95**

Upgrade copies and new manuals available for owners of the 1.0 version for $20.00. Send serial number when ordering!

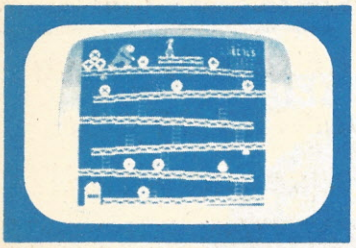
(Check, money order, Visa or Master Charge - allow 2 to 3 weeks for delivery. Add $2.00 for Shipping and Handling.)

*NAME* _____
*ADDRESS* _____
*CITY* _____ *STATE* _____ *ZIP* _____
*PHONE* _____
*VISA* _____
*MC* _____
*EXPIRATION DATE* _____
*SIGNATURE* _____

Derringer Software, Post Office Box 5300, Florence, S.C. 29502. Phone: (803) 665-0314 after 6:00 p.m., Monday - Friday. Before 10:00 p.m. on weekends.

# TOM MIX SOFTWARE

•FOR THE COLOR COMPUTER & TDP 100 • 3424 College N.E., Grand Rapids, MI 49505 (616) 364-4791•



## DONKEY KING

1982
32K Machine Language
**$26.95 tape**
**$29.95 disk**

**ARCADE ACTION** - How high can you climb? Four full graphic screens. Exciting Sound - Realistic graphics. Never before has the color computer seen a game like this. Early reviews say: Just like the arcade - Simply outstanding!

NEW

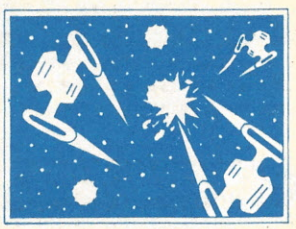
## SPACE SHUTTLE

1983
32K Ext. Basic

**$28.95 TAPE ONLY**

This program gives you the real feeling of flight. Full instrumentation complete to the max. Actual simulation of space flight. **32K Ext. Basic**

## PROTECTORS



Exciting fast paced arcade game that looks and plays like the popular arcade game "DEFENDER",
Wave after wave of enemy fighters drop bombs on your city. Destroy them before they destroy your city. Soon the mother ships appear firing laser blasts at you. Watch for the heat seeking mines.
Your defense includes your laser cannon plus four smart bombs on each of your four ships. A new ship with each 5,000 points.
High resolution graphics with four colors make this new 32K arcade game the one for others to follow.

**$24.95 TAPE $27.95 DISK**

## KATERPILLAR ATTACK

Outstanding graphics and sound will end all of those trips to the arcade. So much like the arcade you have to see it to believe it. Requires Ext. Basic.

**16K MACHINE LANGUAGE** **$21.95**
**DISK** **$24.95**

## COLOR GOLF

Now sit at your computer and play nine or eighteen holes. Outstanding graphics in the fairway or on the green. Helps your game.
**32K EXTENDED BASIC** **$17.95**

## SEARCH-A-WORD

This Program generates a word search puzzle to your specifications. You specify the size of the puzzle and the number of words that it is to hide within the puzzle. 16K or 32K Ext. Basic.

**TAPE** **$17.95**
**FLEX VERSION** **$27.95**

**BIRD ATTACK**-A fast paced machine language arcade game. Shoot the birdmen before they descend upon you. Watch out for their bombs! **16K Machine Language** **$21.95**

**MAZE RACE**-Maze race is a one or two player game. Play either against the built in timer or against your favorite opponent. **16K Machine Code** **$17.95**

**SOLO POOL**-Now play pool with your color computer. Two players. Plays like machine language. Super color. High resolution graphics. **16K Ext. Basic** **$17.95**

## OTHER GREAT GAMES

ALL PROGRAMS REQUIRE 16K

**MOON LANDER**•Fantastic Graphics. Land on the Moon if you can. 2 Programs. Ext. Basic **$17.95**

**DANCING DEVIL**•Watch him dance to music or program him yourself. Machine Language. **$14.95**

**WAR KINGS**•Battle to save your castle and king. High resolution graphics with outstanding sound make this one a real winner. 16K Machine Language **$17.95**

## ADVENTURES

**TREK-16**-Travel thru space with Spock and Capt. Kirk. Adventure. Tough! Ext. Basic. **$17.95**

**SHIPWRECK**-Escape from a desert isle if you can. Great Adventure! Ext. Basic. **$14.95**

**ESCAPE FROM SPECTRE (Graphic Adventure)**-You are a secret agent for British Intelligence sent on a mission to obtain the secret nerve gas formula being developed by S.P.E.C.T.R.E. to destroy the world. **16K Ext. Basic** **$17.95**

## UTILITIES

**COLOR MONITOR**-Written in position independent code. (May be located in any free memory). Very compact. Only occupies 1174 bytes of memory. Full Featured. Includes Break-Pointing of machine language programs, register display and modify, memory display and modify, and block memory move commands. Displays memory in hex and ascii format on one line 8 bytes long. **MACHINE LANGUAGE $24.95**

**ROM**-This program is a utility that will move "most" 8K Rom-Packs to disk and allow you to run them from disk. Easy to use. Requires 64K. **$17.95**

**SCREEN PRINT ROUTINE**-Using your Epson or Microline Printer. Print the screen contents on a full size 8½ x 11 sheet. 16K Ext. Basic **$17.95**

**TAPE DUPE**—Brand new machine language program that copies any tape effortlessly. Completely automatic. **$16.95**

**DISK TO TAPE**-Dump the contents of any disk to tape automatically. Machine Language. **$17.95**

**TAPE TO DISK**-Load the contents of any tape to disk automatically. Machine Language. **$17.95**

**MAIL LIST**-Maintain a complete mailing list with phone numbers etc. Ext. Basic. **$17.95**

**THE FIXER**-Having trouble moving those 600 Hex progams to disk? The fixer will help. Completely automatic. **$17.95**

**TAPE CAT**-All new machine language program lists contents of tapes to printer. Make a catalog of your tapes. **$17.95**

**PROGRAM PRINTER UTILITY**-This program will list basic programs to your printer in two column format. Saves paper and makes your listing look professional. Disk based. **$17.95**

VISA

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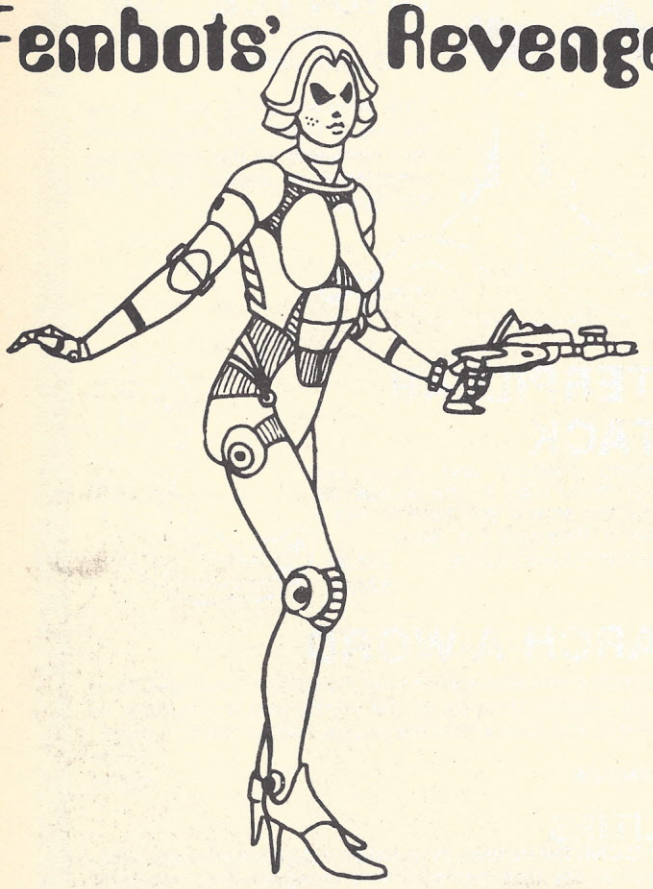
MasterCard

# ColorQuest™ GAMES

**For The TRS-80 Color and TDP System 100**

**Fast Machine Code • Hi-res Color Graphics • Exciting Arcade Action and Sound**

## Fembots' Revenge™

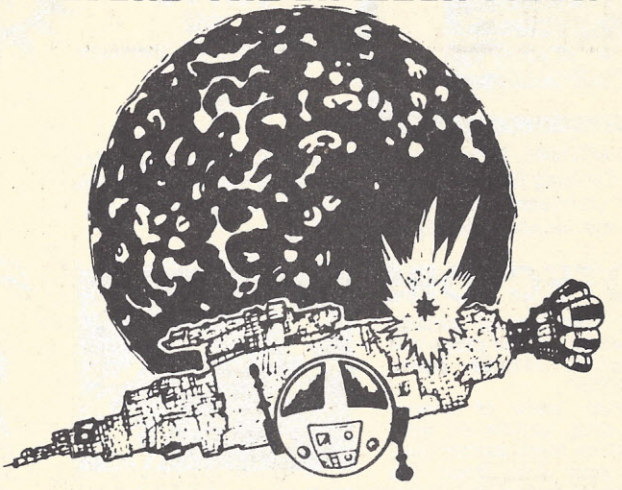


**3-D GRAPHIC ADVENTURE**

Make love not war? Not with these sultry FEMBOTS! What a tale you'll tell IF you live to tell it! Cold steel never felt so HOT! The color and excitement of ARCADE ACTION combined with the sophistication, intellectual challenge and skill of an ADVENTURE GAME doesn't fully describe this cosmic shoot'em up.

**16K Tape $29.95** **32K Disk $34.95**

## BEYOND THE CIMEEON MOON™



by Kevin Herrboldt & Tim Nelson

**3-D GRAPHIC ADVENTURE**

A dead star . . . A derlict vessel . . . or is it? Trapped within you must venture the corridors; defend yourself against the merciless gauntlet of agents of the machine mind. A real-time, high-res, 3-D science fiction adventure game of mind-blowing magnitude.

**16K Tape $24.95** **32K Disk $29.95**

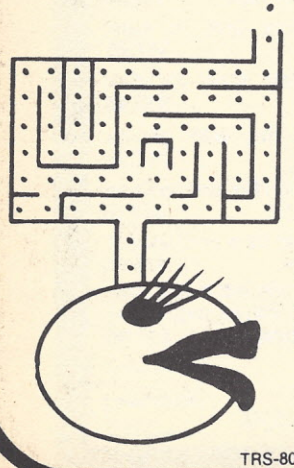
## Adventure Trilogy™

by Kevin Herrboldt & Tim Nelson

**3-D GRAPHIC ADVENTURE**

Clash steel with thy foe in the arena of gore. Proved worthy, go in guest of the elusive Eye of Dazmor. If ye findest the orb, hast ye the might to ward off skem and the fortitude to restore the Eye? The ultimate high-res, 3-D quest for even the most experienced adventurer!

**16K Tape $24.95** **32K Disk $29.95**



## MS. NIBBLER™

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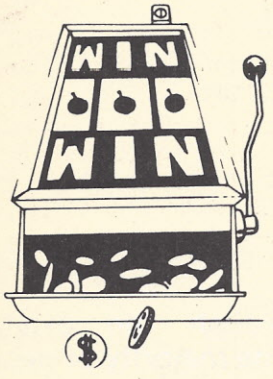


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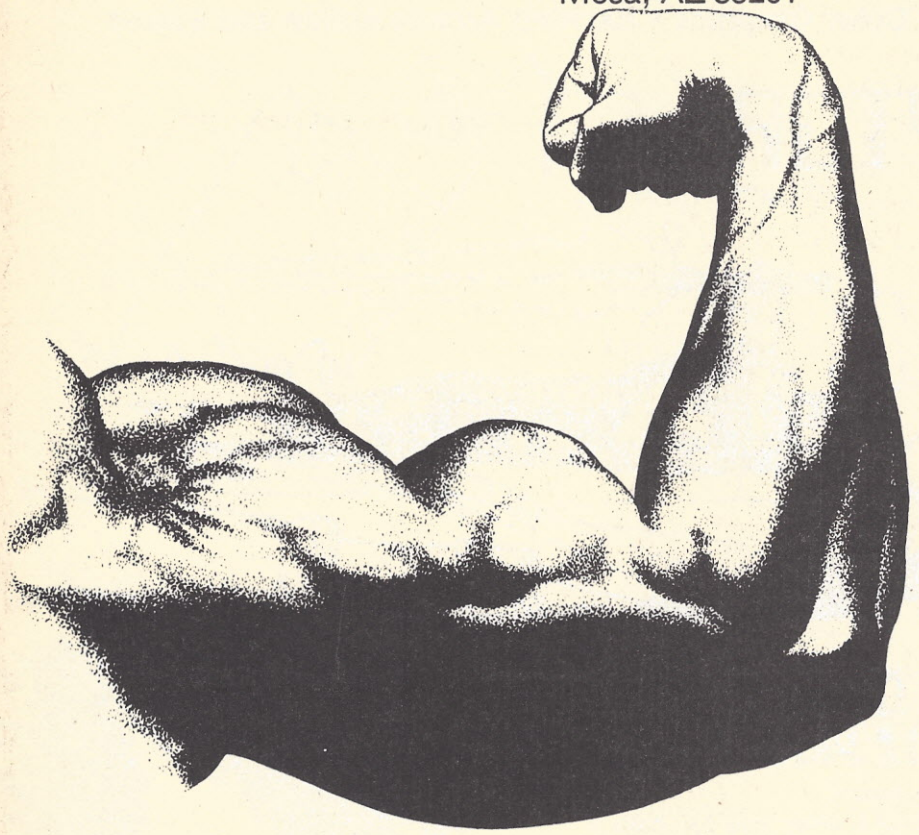

## MORE DOS COMMANDS

Last month we examined how FLEX is booted from a Radio Shack compatible disk. If your head has now stopped spinning we will continue our discussion of FLEX's command utility programs.

## A LITTLE TALK

But before we get started, let's have a little talk about the available DOS's. Obviously FLEX and Radio Shack's Disk BASIC system are available, and have been for some time. I'm not sure whether Peter Stark is shipping Star-Dos yet or not, but he does have it running. However, I believe that no matter how long these DOS's have been around or how popular they may become, that the 'standard' DOS for the Color Computer will be OS-9. The reason for this is that OS-9 will be supplied and supported by Radio Shack themselves, rather than an outside vendor.

It is impossible for any outside vendor to reach but a small percentage of the Color Computer owners through the existing advertising mediums. The majority of people who purchase Color Computers do so at their local Radio Shack store, and are totally unaware of the existance of any Color Computer magazines or outside hardware or software vendors for their new computer, other than, of course, Radio Shack themselves.

The only one in the whole world who knows the names and addresses of everyone who ever bought a Color Computer is the big RS (that's Radio Shack for those of you who haven't already figured that out). RS sends each of these owners the company's own monthly magazine in which they always manage to tout about their newest products. And so it will go, that when RS finally introduces OS-9, it will probably immediately outsell the number of users of FLEX, Star-Dos, or what have you, up to that date.

Please don't think I'm up on my high-horse complaining about this. Far from it. I'm merely telling you the way I perceive the situation to be. Believe me, if I were in

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Radio Shack's shoes I'd be sending all of my customers a monthly magazine too!

If fact, I can hardly wait until OS-9 is released, because it happens to be my all time favorite operating system. I have been running it for somewhat over a year now on our Smoke Signal Broadcasting Chieftain computer. I have yet to see any other system and high level language combination that comes close to OS-9/BASIC09 in terms of ease of use, power and versatility, and throughput. So, as soon as RS introduces their OS-9 package, you can bet I'll be running to the store as fast as my little (or maybe not-so-little) feet will carry me.

Is all this to say that FLEX should be forgotten about? Of course not! FLEX is still a fine operating system, and currently has more software available for it than OS-9 does. It is easy to learn and friendly. Also, it is somewhat easier to write assembly language programs to run under FLEX than under OS-9 because all programs running under OS-9 MUST be written in PIC (Position Independent Code) which takes some getting used to. Therefore, FLEX may be better suited for first-time assembly language programmers, although this point is undoubtedly debatable.

Either of these DOS's will add a whole new world of capabilities to your Color Computer. If I had to choose between them I would pick OS-9, but since it's not yet available I'll take FLEX and run!

In a few months we will compare the various BASIC's available for the Color Computer, such as Radio Shack's ROM BASIC, TSC's BASIC and XBASIC, and Microware's BASIC09. But for now, let's carry on with our discussion of FLEX's commands...

Command: COPY

The purpose of the COPY command is to duplicate the contents of one or more files onto the same or a different diskette. If copying to a different diskette, this command requires that your system contain at least two disk drives. If you only have one disk drive then the SDC (Single Disk Copy) command may be used to copy files from one diskette to another. We will discuss the SDC command shortly. The general syntax of the COPY command is:

1) + + + COPY, (file spec), (file spec)
or
2) + + + COPY, (file spec), (drive)
or
3) + + + COPY, (drive), (drive)[, (match list)]

where (match list) is the same as described last month for the CAT command. It allows you to specify only the beginning letter(s) and/or extension of the file name(s) of interest. All file names that match with the specified beginning letter(s) will be copied.

(file spec) is to be a complete file name, optionally containing a drive specification number. (drive) is to be only a single digit from 0 to 3 representing a disk drive number.

If the destination file already exists then FLEX will prompt you with the question "FILE EXISTS, DELETE ORIGINAL?" Responding with "Y" will cause the original destination program to be deleted and then the request file will be copied. Responding with "N" will cause the file to NOT be copied, and the original destination file left in tact.

In the first format above, the first (file spec) will be copied to the second (file spec). For example:

+ + + COPY PROG1.BAS, PROG2.BAS

will copy the file named PROG1.BAS to another file on the same disk, giving the new file the name PROG2.BAS.

+ + + COPY 0.PROG1.BAS, 1.PROG2.BAS

will copy the file named PROG1.BAS from drive 0 to a file named PROG2.BAS on drive 1.

When using this format of the COPY command it is not necessary to specify the file name extension for the destination file unless you want the new file's extension to be different than the source file's. If you do not specify the extension, then the new file will be given the same extension as the source file. For example:

+ + + COPY 0.PROG1.BAS, 1.PROG2

will perform exactly like the previous example.

In the second format above, you only need to specify the destination disk drive number. The new file's name will be the same as the source file's. For example:

+ + + COPY 0.PROG1.BAS,1

will copy a file named PROG1.BAS from

drive 0 to a file named PROG1.BAS on drive 1.

The third format of the COPY command is the most powerful. It allows multiple files to be copied from one drive to another with only a single command. The destination files will be given the same names as their individual source files. Some examples are definitely in order:

+ + +COPY 0,1

This command will cause ALL files to be copied from drive 0 to drive 1 since the (match list) was not specified.

+ + +COPY 1,0,.BAS,.TXT

This command will copy all files with the extension .BAS and all files with the extension .TXT from drive 1 to drive 0.

+ + +COPY 0,1,A.CMD

This command will copy all files from drive 0 to drive 1 which begin with the letter "A" and which have extensions of .CMD.

When using this format of the COPY command, as each file is copied from one disk to the other, the file's name will be displayed on the CRT so that you can see what's happening.

Command: SDC

The SDC command allows you to copy files from one diskette to another on a system with only a single disk drive by alternating the source and destination diskettes in and out of the drive. This command is not a normal FLEX utility. That is, it is not provided by TSC (the authors of FLEX), but by the companies who have adapted FLEX to the Color Computer. Both the Frank Hogg Labs version and the Data-Comp version come with this utility command. These two versions operate basically the same, but do have some small differences. The general syntax of the SDC command is:

+ + +SDC (file spec)[, (file spec)... ]

where (file spec) is the name and extension of a file you wish to copy from one disk to another. More than one file may be specified. The Data-Comp version limits the number of file specifications to five, while the FHL version mentions no limits.

The FHL version prompts you to enter the Source disk before it reads the first file. This means that the SDC command need not be on the source disk along with your other files. After each file is read from the source disk you are prompted to insert the destination disk. With this version you have to swap disks in and out of the drive for each file you specify on the command line.

The Data-Comp version does not prompt you to insert the source diskette before reading the first file, and therefore must reside on the source disk along with your other files. However, unlike the FHL version, this version will read as many of the files you specified into memory as it possibly can before it prompts you to change disks. Therefore, this version forces you to swap the disks fewer times than the FHL version does.

Command: VERIFY

The VERIFY command in FLEX is very similar to the VERIFY command in ROM BASIC. Its purpose is to turn on or off the read-after-write check for the disk. There are three valid ways in which to invoke the VERIFY command:

1) + + +VERIFY,ON
2) + + +VERIFY,OFF
3) + + +VERIFY

The first example above will turn on the read-after-write check for the disk. With this option on, every time the disk is written to FLEX it will attempt to read back the data just written to see if it was written correctly. This causes the system to operate somewhat slower, but is generally recommended for your own protection. The second example above will turn this feature off.

The third example will cause FLEX to display to you the current status of the verify option (ON or OFF). This format is not supported by ROM BASIC.

Command: DELETE

The purpose of the DELETE command is to erase files from a diskette's directory. The general syntax of the DELETE command is:

+ + +DELETE (file spec)[, (file spec)...]

where (file spec) is the name and extension of a file you wish to erase. This command has a buit in safe-guard to prevent you from accidently erasing the incorrect file. It does this by forcing you to answer the following two questions for each file you specify:

DELETE "file spec"?
ARE YOU SURE?

where file spec is replaced by the name you

specified. Both questions must be answered with a "Y" in order for the file to be deleted, otherwise the file is left intact.

Another way in which you are protected is that the DELETE command will not delete any file whose delete-protect attribute has been set in its directory entry. This attribute is set with the PROT command (which we will discuss later) and may be seen via the DIR command. Also, any file which has been entered into the printer spooler queue will not be deleted. We will also discuss the printer spooler later, even though it has not yet been implemented on the Color Computer.

Let's toss in here a word about what it means to delete a file from a disk. Does it mean that when a file is deleted, all the data on the disk that was contained within the file must be destroyed? No. Only the following two things happen:

1) The file's name is cleared from the directory on the disk so that you can no longer get at the file's data through any normal means.

2) The sectors that were contained within the file are tagged onto the end of the Free Chain so that they may be used by some other file at a later date.

The data that was contained within the file is left in tact somewhere in the newly available free space on the disk. This is why it is that some commands which we will discuss later can actually recover a file after it has been deleted.

Command: RENAME

The RENAME command allows you to change the name of files on your disks. (This is just in case you get tired of their old names). The general syntax of the RENAME command is:

+ + + RENAME (file spec 1), (file spec 2)

where (file spec 1) is the original name of the file and (file spec 2) is the new name you want assigned to the file. If there is already a file on the disk with the same name as this new name then the following message will be displayed.

FILE EXISTS

and the original name will be left intact.

Command: LIST

The LIST command is used to list the contents of text or BASIC files to the CRT. The listing may be directed to your line printer by preceding the LIST command with the P command. The general syntax of the LIST command is:

+ + + LIST (file spec)[, (line range)][, + (options)]

where (file spec) is the name of the file to be listed. If no extension is specified then a default of .TXT will be used. That is, if you only specify the file name "PROG1", then the actual file name used will be "PROG1.TXT". Note, the file must consist of only ASCII characters. Listing a binary file may cause strange results.

(line range) is the first and last line number of the range of lines you wish to have displayed from the file. The line numbers within the file begin with 1 and are incremented by 1 for each following line. For instance:

+ + + LIST LETTER,10-15

will list the tenth through the fifteenth lines of the file LETTER.TXT. If only the first line number is specified as follows:

+ + + LIST LETTER,16

then the file is listed from the given line number (16 in this example) all the way to its end.

Either or both of two options may be specified in place of (+ options). They are:

+ N This will cause the line numbers to be listed along with the text of the file.

+ P This causes the output listing to be formatted into pages, each page receiving a title, the current date, and a page number. If you specify this option then you will be prompted to enter the title which you would like on the listing.

+ NP This form may be used to invoke both options.

## NEXT MONTH

Next month we will continue our trek over the FLEX command utility programs. We may look into what it actually means to your Color Computer to have 64K of RAM. And, if all goes well, I hope to start looking into the possible methods of running BASIC under FLEX. 'Til next month...

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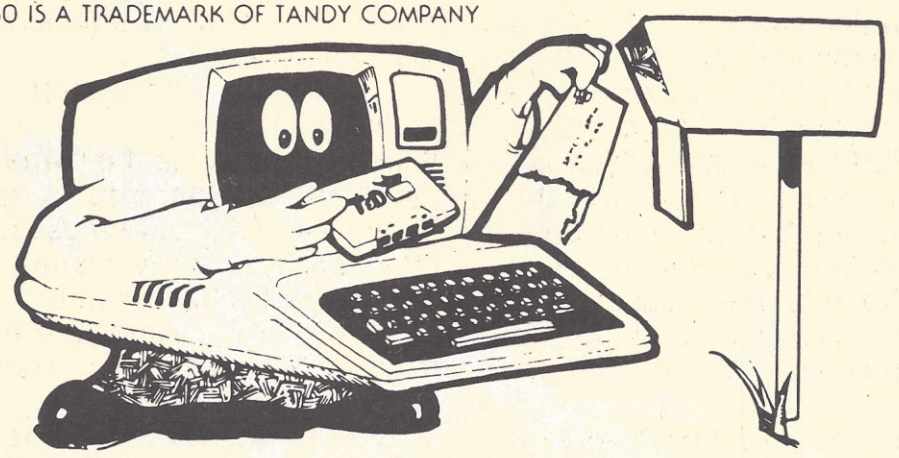

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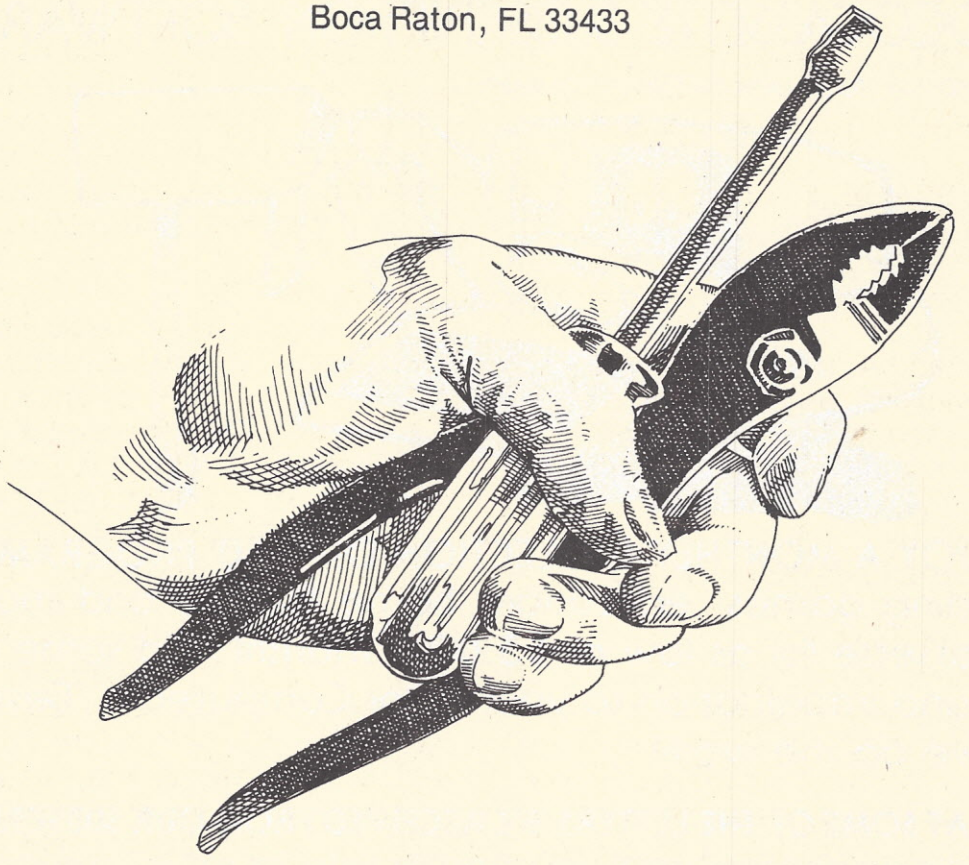
# ASSEMBLER LANGUAGE PROGRAMMING TOOL

By Rita Sabo
20819 Via Valencia
Boca Raton, FL 33433



You certainly guessed by now that 80% of your BASIC program's execution time is taken up by about 20% of your code, right? Well, a good way to improve the execution of these BASIC programs is to call an assembler routine that performs the task that the BASIC routine handles slowly. Yes, but you don't want to spend those "hard earned" dollars for the needed assembler (just as I did not). Well here you can find an ASSEMBLER, together with a full screen EDITOR, a DISASSEMBLER (so you can see how the experts did it in the ROM), and since you don't want to be left alone in the nightmare of debugging assembler programs, a MONITOR/TRACE/DEBUG (whatever you prefer to name it).

Using the EDITOR you'll be able to introduce the source code. The program allocates each of the source lines in the array ED$. When you finish the entry of the source you can assemble it. At that point, the ASSEMBLER will convert the source code into pseudo-machine code and will save it into array OB$. While you don't have to save the source code to assemble it, (the ASSEMBLER takes the source code directly from memory) for reasons of storage it is necessary to break the development system into two separate programs: EDITOR/ASSEMBLER and DISASSEMBLER/MONITOR.

Once your program has been assembled without errors, save the pseudo-machine code on tape (hey! don't forget to save your source program too), load the DISASSEMBLER/MONITOR program and read the pseudo-machine code back into memory. DISMON/2 (the name for the disassembler/monitor) will convert the pseudo-machine code into real machine code ready to be executed. Now let's go into detail.

EDISAM/2 DESCRIPTION:

To use this program you need 32 KB of memory, however if you have only 16 KB see the observations at the end of this article.

Before loading EDISAM/2 perform a PCLEAR of 1 to get more memory, then do the CLOAD and RUN the program. A MENU will appear with 4 options:

1 = EDIT
2 = ASSEMBLE

3= SAVE (PSEUDO-MACHINE CODE)
4= END

option 1 (EDIT). A second MENU will appear:

1= LOAD FROM TAPE (source code)
2= EDITOR
3= CLEAR SPACE (of editor)
4= END (editor)

Because this is the first edition, the EDITOR's area is clean, and we don't need to load from tape. Therefore option 2 is directly selected. A screen with three bars will appear (purple, yellow and black). The purple bar is used to type commands (at the moment only two commands are valid: I to insert a new line, and D to delete a line).

The yellow bar indicates the position where the instructions operator code has to be placed. The black bar signals the right end of the valid page.

You can move the cursor all around the screen by using the arrow keys. The arrow keys are auto-repeat keys, so if you keep pressing them the cursor continues moving. The information will get recorded when you press some of the following paging keys:

SHIFT + UP ARROW = Advances to next page
SHIFT + DOWN ARROW = Goes back one page
SHIFT + RIGHT ARROW = End editing
SHIFT + LEFT ARROW = Top of program
CLEAR = To position the cursor in the yellow column of next row

All of these keys when pressed will record the contents of the page. If you want to record the page's contents but do not wish to advance the page, simply press ENTER.

You can now copy one or several lines simply by overtyping the number as the new line's number. For example, if you want to copy line 026 to line 123, overtype the 123 on 026 and press ENTER. Line 123 will now be a duplicate of line 26.

After ending the EDITOR, the menu will reappear. You can save your program on tape by selecting option 4. The name of the file will be asked. Position the tape and press ENTER.

Option 3 (Clear editor's area) will rarely be used. It will delete your whole program so that you can enter a new one. To prevent accidental erasures, a confirmation request is made before deletion takes place.

Option 1 is used to load a previous source program from tape to the editor's area. The name of the file will be asked. If you don't give a name, the first found file will be loaded. Also, to prevent accidental destruction of your current data a confirmation request is made.
Use option 5 to return to main menu.

ASSEMBLER

Once you have entered your program with the EDITOR you can assemble it using option 2. You can direct the output of the ASSEMBLER to the printer or display. If you want to print the output answer Y when "OUTPUT TO PRINTER?" appears.

When the assembly starts, a horizontal black bar is displayed. This bar will get shorter as each of the instructions is assembled. If the bar is at halfway then the assembly has advanced 50%

Every time the assembler finds an error a low tone will be emited. So, if you wish to cancel the assembly at this point press "A" (Abort). In this case the output will contain only those instructions that were assembled. You can correct the error(s) and retry. If you don't wish to cancel, then all the errors will be shown at the assembly output.

The following are the errors that you may have:

* * * range = You made a reference to a label that is located too far. (Example, a BRA is referencing a label outside the -127/128 bytes range, use LBRA).
* * * label = A reference to a non-existing label was made.
* * * no-op = The operation code does not exist or the addressing mode is not supported for this instruction.
* * * error = Usually reflects a pure syntax error.

These messages cover almost all of the possible errors. However there are some errors that will not be flagged by the assembler, for example: LDA #$AAAA will not be flagged. The assembler will generate the code equivalent to LDA #$AA.

So much for the good news. The bad news is that there are some limitations, some of them already mentioned. While I made the ASSEMBLER trying to keep it as standard as possible there are some considerations that you should be aware of:

The operation code has to start in a specific column.

The last character of the operation code and the first character of the operator field must be separated by one space.

The indexed instructions of auto-decrement (ex: LDX ,-Y) should be specified as LDX ,Y-.

While the resulting object code should almost exactly match the object code of a commercial assembler (5 bits offset is made automatically, etc), all references to labels will lead to 16 bits offsets. See the example below:

```
LDY 4,X = 5 bit offset
LDX FOUR,X
FOUR EQU 4 = 16 bit offset
```

The following assembler directives are supported:

EQU,* ,ORG,RMB,FCC,FCB,FDB,END

Comments are not allowed in the same area as an instruction.

FCB supports one byte definition per instruction.

None of the assembler directives supports arithmetic expressions.

The octal and binary representations of data are not supported. Use "$" for hexadecimal and "'" for character, and nothing at all for decimal.

The maximum label size is of 6 characters. The first character must be alphabetic.

To reference the PC register use "P" only, to reference the DPR use "G".

The assembler is rather slow (remember it is made in BASIC). You must expect an average assembly time of 3 or 4 seconds for each executable instruction. So, be patient. This is still much more faster than hand-assembly!

As provided, the maximum number of source lines is 320. This value must be enough for most of the routines, should you exceed it, you can do several things:

A) Remove the comment lines

B) Make a POKE 25,6 and POKE 26,0 and then NEW, to obtain 1.5 KB of additional storage. Modify the ED$, OB$ and LB$ dimensioned sizes (LB$ is used for labels). Also change the value for SZ and XL variables to match the array sizes, finally increase the size reserved by the CLEAR statement. (These changes affect line 4, 12 and 16 of the EDISAM/2 program).

C) Break the routine in parts, and assemble the parts separately.

The previous may be good on exceptional basis, if you find yourself trying to accomodate these values rather frequently, then it may be time for you to buy a commercial assembler.

## SUGGESTED IMPROVEMENTS

The EDITOR/ASSEMBLER can be improved in several ways, following are some possible improvements:

You can add more commands for the EDITOR such as string searching and string's change.

The assembler execution time can be improved by replacing lines 524 to 552 by an assembler routine.

You can get a symbol table by printing the contents of array lb$.

Remember that some of these improvements have to be made at expense of the maximum possible number of instructions.

## DISASSEMBLER/MONITOR

Did you finish the assembly of your program without errors? Fine, now the most interesting part begins, debugging the logic. While BASIC nicely tells you when an error is made, the computer may hang-up if the program malfunctions when running a machine language program. It is important to know what's happening there. This is the reason for a trace program. To load DISMON/2, make a PCLEAR 4 (if using a 32 KB machine) and CLOAD. Type RUN, a menu will appear.

1 = LOAD (pseudo-object code)
2 = DIS-ASSembler
3 = SAVE (machine code)
4 = MONITOR
5 = END

If you are debugging one of your programs, select option 1 first. This will prompt the name of the file with a pseudo-machine code, and will ask for an offset. This offset, if selected, will be added to the addresses which were specified during the assembly. You must be aware of the resulting start address so that you can specify it at the moment of debugging.

Do you want to see your program in memory? Then select option 2 (Disassembler). The address from which you want to start is asked. Give the start address of

your program and press ENTER. A screen with the dis-assembly of your program will appear. It should look like the source code, the difference being that in place of the labels, the real referenced addresses are shown. In the case of relative addressing (branches and PC relatives) the resulting absolute address is also shown at the right.

In the far right of each line the type of addressing is indicated:

R = RELATIVE
H = INHERENT
I = INMEDIATE
D = DIRECT
E = EXTENDED
X = INDEXED

When the page is displayed the system will wait for some of the following:

P = Print the contents of this page
O = Go to dis-assemble another address
SHIFT + UP ARROW = Advance page
SHIFT + DOWN ARROW = Go back one page (You can not request this option two consecutive times).
SHIFT + LEFT ARROW = Go to where the dis-assembler was first started.
SHIFT + RIGHT ARROW = Terminate dis-assembly.

To actually execute your program select 4 (MONITOR). A prompt command will be shown. Type ''HE''; all valid commands will be displayed. As you can see, there are several commands. In general you can do the following:

Start the execution of a routine from a given address (if no address is specified, it will resume execution with the next instruction). At first time at lease you must specify an address. This is made with the ''GO'' command.

Usually the monitor will trace the program INSTRUCTION-BY-INSTRUCTION, while displaying the values for each one of the HW registers AFTER the instruction has been executed. If you want to exit this mode, key ''E'' and you'll be back in the COMMAND prompt. You can set the ''TF'' (trace off) if you don't want to go one instruction at a time. ''TO'' (trace on) is the default.

Set a break point (''SB''). The program will stop BEFORE executing the instruction at the specified address. You can only define one address at a time.

If you want to modify the value of a register select ''SR''.

To see the values of the register, enter ''DR''.

To display the contents of an area of memory (up to 8: bytes, or double bytes) use ''DM''. Specify if you want the display in hexadecimal (''X''), character (''A''), or numeric decimal (''N'').

To modify a byte or double byte of memory use ''SM''.

If while tracing you don't want to review all segments of the program that are called via JSR (jump to subroutine), enter ''SF''. If you want to go back to review them enter ''SO'' (the default).

To exit the MONITOR use ''EN''.

All invalid commands will be signaled with a low tone.

CONSIDERATIONS

The MONITOR works by copying the actual instruction into an area of memory (5 NOPs) of the MONITOR's own machine language routine. The instruction is executed there. The code in the machine language section of the MONITOR takes charge of preserving the environment of the program being monitored.

Because there are some instructions that affect the PC register, the BASIC section of the MONITOR may emulate its function rather than allowing it to execute them. However, three specific instructions are not intercepted: SYNC, CWAI, and the SWI. These instruction will be executed in the MONITOR's area. Eventhough they may call interrupt routines, if these routines return via RTI, you should regain control of the program.

The MONITOR is very handy for debugging your own programs, or for learning the workings of the 6809 code, with it you also can trace ROM routines. Only keep in mind that the ROM routine you are tracing may not be reenterable. Since BASIC is also using these routines, the integrity of DISMON may be affected.

Eventhough SWI is not traced, you can trace interrupt routines separately. In general, always debug the INNER or NESTED routines of your code first. This will let you pin point the errors more easily. Once you are sure they work as expected, use the ''SF'' command to bypass their tracing.

As a word of warning, be careful when

tracing programs that use graphics. If you are in a 32 KB system, avoid programs that use graphic pages 4 thru 8. If you have 16 KB be careful of all of them since you will need pages 0 thru 3 for the dis-assembler/monitor.

If you have such programs use the DIS-ASSEMBLER to spot the instructions that may change the contents of memory at locations used by BASIC, set break point to stop before these instructions are executed, and modify the instruction to point to a different address.

In a 32 KB system, load your machine code above address 30000, this will let you have a program of over 2 KB (for assembler standards this is a reasonable size).

The MONITOR requires address 27000 to 29999 for its own routine and stacks. The MONITOR's routine is relocatable, but it is not reenterable. So don't try to trace it.

If during assembly you increased the size of the ED$ array, remember to increase the value of variable SZ in line 8 accordingly.

For the owners of 16 KB Color Computers, I first developed this system in a 16 KB computer (blood and sweat). When entering the DISMON program, remove all comments and all possible spaces. Change the CLEAR statement to reserve a lower location, and change the value of the variable IZ (line 3) accordingly. The hexadecimal value of IZ must finish with X'BC'.

For the ASSEMBLER program, (EDISAM), reduce the number of possible source lines from 320 to 80, and the CLEAR from 8000 to 1500. The maximum number of labels (LB$) must also be reduced (from 80 to 16). When typing take away all comments and spaces. Before loading EDISAM or DISMON make a POKE 25,6 and POKE 26,0 to get 1.5 KB extra.

Since the DATA statements that describe the 6809 mnemonics are the same for the EDISAM and the DISMON programs. I suggest typing them first and saving them on tape. From there on you can finish typing each of the two programs.

Before saving your typed programs enter POKE 65494,0 since both programs use the high-speed option.

Both programs are COPYRIGHT (1982) by the author, readers of Color Computer News are given permission to use these programs on their own systems, but the Copyright notice must appear in the source code.

I hope that with these programs and the speed of machine code you'll enjoy your Color Computer even more.

```
4 CLEAR 7ØØØ
8 POKE 65495,Ø
12 DIM ED$(32Ø),OB$(32Ø),LB$(8Ø)

16 XL=8Ø:SZ=32Ø:ST$="CABGXYKP":D
R$="DXYUSPABCG":RR$="*range*":ER
$="*error*":BB$="*label*"
2Ø CLS:PRINT@1Ø,"editor/assemble
r";:PRINT@486,"cOPYRIGHT BY RITA
 SABO";:PRINT@76,"1= EDIT":PRINT
@14Ø,"2= ASSEMBLE":PRINT@2Ø4,"3=
 SAVE";:PRINT@268,"4= END";
24 PRINT:PRINT:PRINT:PRINT TAB(1
4);:INPUT "option =  ";OP:IF OPC
=1 THEN GOSUB 48
28 IF OPC=2 THEN GOSUB 434
36 IF OPC=3 THEN GOSUB 988
4Ø IF OPC<>4 THEN 2Ø ELSE POKE 6
5494,Ø
44 CLS:END
48 CLS(3):PRINT@74,"1= LOAD FROM
 TAPE";:PRINT@138,"2= EDIT";:PRI
NT@2Ø2,"3= CLEAR SPACE";:PRINT@2
66,"4= SAVE TO TAPE";:PRINT@33Ø,
"5= END";:PRINT@384:PRINT@4ØØ,""
;:INPUT A:IF A<1 OR A>5 THEN 48
52 ON A GOTO 64,56,64,76,1Ø4
56 CLS:OD=1:GOSUB1Ø8
6Ø GOTO48
64 PRINT@492,"...SURE?";
68 A$=INKEY$:IF A$="" THEN 68 EL
SE IF A$<>"Y" THEN 48
72 FOR I=1 TO SZ:ED$(I)="":NEXT:
IF A=3 THEN 48
76 PRINT@448,"";:INPUT "FILE NAM
E";B$
8Ø GOSUB1ØØ8
84 IF A=1 THEN 96
88 OPEN "O",-1,B$:FOR I=1 TO SZ:
IF ED$(I)="" THEN I=SZ ELSE PRIN
T#-1,ED$(I)
92 NEXT:CLOSE -1:POKE65495,Ø:GOT
048
96 OPEN "I",-1,B$:FOR I=1 TO SZ:
IF EOF(-1) THEN I=SZ ELSE LINE I
NPUT#-1,ED$(I)
1ØØ NEXT:CLOSE -1:POKE65495,Ø:GO
TO48
1Ø4 RETURN
```

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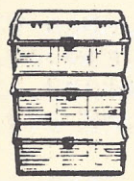

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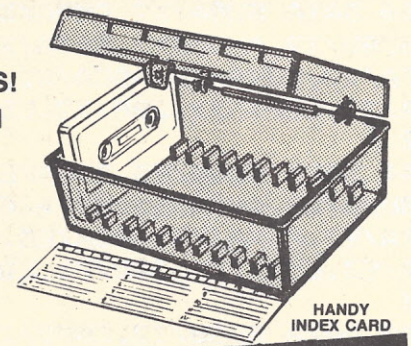

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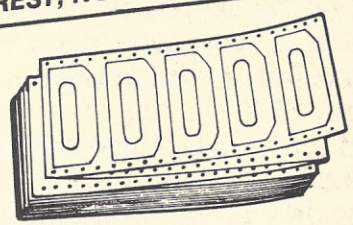

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```
100 CLS:PO=0:FOR I=OD TO OD+15:P
RINT@PO,CHR$(191);:PRINT@PO+1,US
ING "###";I;:PRINT@PO+4,">";:PRI
NT@PO+12,CHR$(159);:PRINT@PO+5,E
D$(I);:PRINT@PO+29,CHR$(128);:PO
=PO+32:NEXT
110 HY=-1:XS=0:XA=0:YA=0:XB=28:Y
B=15:GOSUB 288:IF HY=-1 THEN 172

116 OA=OD:FOR I=1024 TO 1024+HY*
32 STEP 32
120 IF PEEK(I)=68 OR PEEK(I)=73
THEN FL=1
124 A$="":FORJ=I+1TOI+3:A$=A$+CH
R$(PEEK(J) AND &HBF):NEXT:X=VAL(
A$)
128 IF X<1 OR X>SZ THEN 168
132 IF OA<>X THEN GOSUB 424
136 A$="":FOR J=I+5 TO I+28
140 N=PEEK(J):IF N<60 OR N>90 TH
EN N=N AND &HBF
144 A$=A$+CHR$(N):NEXT:ED$(X)=A$

148 OA=OA+1:NEXT:IF FL=0 THEN 17
2
152 FOR I=1024 TO 1504 STEP 32:Y
=PEEK(I)
156 A$="":FORJ=I+1TOI+3:A$=A$+CH
R$(PEEK(J) AND &HBF):NEXT:X=VAL(
A$)
160 IF Y=68 THEN GOSUB 392:GOTO
168 'D
164 IF Y=73 THEN GOSUB 404 'I
168 NEXT
172 FL=0:ON AC GOTO 108,176,184,
192,196
176 OD=OD+16:IF OD>SZ-16THEN OD=
SZ-15
180 GOTO 108
184 OD=OD-16:IF OD<0 THEN OD=1
188 GOTO108
192 OD=1:GOTO108
196 RETURN
200 DATA NEG/D2,?,?,COM/D2,LSR/D
2,?,ROR/D2,ASR/D2,ASL/D2,ROL/D2,
DEC/D2,?,INC/D2,TST/D2,JMP/D2,CL
R/D2
204 DATA P2,P3,NOP/H1,SYNC/H1,?,
?,LBRA/R3,LBSR/R3,?,DAA/H2,ORCC/
I2,?,ANDCC/I2,SEX/H1,EXG/H2,TFR/
H2
208 DATA BRA/R2,BRN/R2,BHI/R2,BL
S/R2,BHS/R2,BLO/R2,BNE/R2,BEQ/R2
,BVC/R2,BVS/R2,BPL/R2,BMI/R2,BGE
/R2,BLT/R2,BGT/R2,BLE/R2
212 DATA LEAX/X2,LEAY/X2,LEAS/X2
,LEAU/X2,PSHS/H2,PULS/H2,PSHU/H2
,PULU/H2,?,RTS/H1,ABX/H1,RTI/H1,
CWAI/I2,MUL/H1,?,SWI/H1
216 DATA NEGA/H1,?,?,COMA/H1,LSR
A/H1,?,RORA/H1,ASRA/H1,ASLA/H1,R
OLA/H1,DECA/H1,?,INCA/H1,TSTA/H1
,?,CLRA/H1
220 DATA NEGB/H1,?,?,COMB/H1,LSR
B/H1,?,RORB/H1,ASRB/H1,ASLB/H1,R
OLB/H1,DECB/H1,?,INCB/H1,TSTB/H1
,?,CLRB/H1
224 DATA NEG/X2,?,?,COM/X2,LSR/X
2,?,ROR/X2,ASR/X2,ASL/X2,ROL/X2,
DEC/X2,?,INC/X2,TST/X2,JMP/X2,CL
R/X2
228 DATA NEG/E3,?,?,COM/E3,LSR/E
3,?,ROR/E3,ASR/E3,ASL/E3,ROL/E3,
DEC/E3,?,INC/E3,TST/E3,JMP/E3,CL
R/E3
232 DATA SUBA/I2,CMPA/I2,SBCA/I2
,SUBD/I2,ANDA/I2,BITA/I2,LDA/I2,
?,EORA/I2,ADCA/I2,ORA/I2,ADDA/I2
,CMPX/I2,BSR/R2,LDX/I3,?
236 DATA SUBA/D2,CMPA/D2,SBCA/D2
,SUBD/D2,ANDA/D2,BITA/D2,LDA/D2,
STA/D2,EORA/D2,ADCA/D2,ORA/D2,AD
DA/D2,CMPX/D2,JSR/D2,LDX/D2,STX/
D2
240 DATA SUBA/X2,CMPA/X2,SBCA/X2
,SUBD/X2,ANDA/X2,BITA/X2,LDA/X2,
STA/X2,EORA/X2,ADCA/X2,ORA/X2,AD
DA/X2,CMPX/X2,JSR/X2,LDX/X2,STX/
X2
244 DATA SUBA/E3,CMPA/E3,SBCA/E3
,SUBD/E3,ANDA/E3,BITA/E3,LDA/E3,
STA/E3,EORA/E3,ADCA/E3,ORA/E3,AD
DA/E3,CMPX/E3,JSR/E3,LDX/E3,STX/
E3
248 DATA SUBB/I2,CMPB/I2,SBCB/I2
,ADDD/I3,ANDB/I2,BITB/I2,LDB/I2,
?,EORB/I2,ADCB/I2,ORB/I2,ADDB/I2
,LDD/I3,?,LDU/I3,?
252 DATA SUBB/D2,CMPB/D2,SBCB/D2
,ADDD/D2,ANDB/D2,BITB/D2,LDB/D2,
STB/D2,EORB/D2,ADCB/D2,ORB/D2,AD
DB/D2,LDD/D2,STD/D2,LDU/D2,STU/D
2
256 DATA SUBB/X2,CMPB/X2,SBCB/X2
,ADDD/X2,ANDB/X2,BITB/X2,LDB/X2,
STB/X2,EORB/X2,ADCB/X2,ORB/X2,AD
DB/X2,LDD/X2,STD/X2,LDU/X2,STU/X
2
260 DATA SUBB/E3,CMPB/E3,SBCB/E3
,ADDD/E3,ANDB/E3,BITB/E3,LDB/E3,
STB/E3,EORB/E3,ADCB/E3,ORB/E3,AD
DB/E3,LDD/E3,STD/E3,LDU/E3,STU/E
3
264 'PAGE 2 AND 3 INSTRUCTIONS
268 DATA 1021/LBRN/R4,1022/LBHI/
R4,1023/LBLS/R4,1024/LBHS/R4,102
```

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```
5/LBCS/R4,1026/LBNE/R4,1027/LBEQ
/R4,1028/LBVC/R4,1029/LBVS/R4,10
2A/LBPL/R4,102B/LBMI/R4,102C/LBG
E/R4,102D/LBLT/R4,102E/LBGT/R4,1
02F/LBLE/R4
272 DATA 103F/SWI2/H2,1083/CMPD/
I4,108C/CMPY/I4,108E/LDY/I4,1093
/CMPD/D3,109C/CMPY/D3,109E/LDY/D
3,109F/STY/D3
276 DATA 10A3/CMPD/X3,10AC/CMPY/
X3,10AE/LDY/X3,10AF/STY/X3,10B3/
CMPD/E4,10BC/CMPY/E4,10BE/LDY/E4
,10BF/STY/E4
280 DATA 10CE/LDS/I4,10DE/LDS/D3
,10DF/STS/D3,10EE/LDS/X3,10EF/ST
S/X3,10FE/LDS/E4,10FF/STS/E4,113
F/SWI3/H2,1183/CMPU/I4,118C/CMPS
/I4,1193/CMPU/D3,119C/CMPS/D3,11
A3/CMPU/X3,11AC/CMPS/X3,11B3/CMP
U/E4,11BC/CMPS/E4,*
288 AC=1:X=XS
292 Y1=INT(X/32):X1=X-Y1*32
296 IF X1<XA THEN X=X+1*SN:Y1=Y1
-1:IF Y1<0 THEN Y1=15:GOTO 292 E
LSE 292
300 IF X1>XB THEN X1=XA+5:Y1=Y1+
1:IF Y1>15 THEN Y1=0
304 IF Y1>YB THEN X=XS:GOTO292
308 Q=PEEK(X+&H400):IF Q=191 OR
Q=159THEN POKE X+&H400,96 ELSE P
OKE X+&H400,Q AND &HBF
312 FOR I=1TO5:NEXT:POKE X+&H400
,Q
316 IF PEEK(343)=247 THEN X1=X1-
1 ELSE 324
320 SN=-1:IF X1<XA THEN X1=XB:Y1
=Y1-1:IF Y1<0 THEN Y1=15
324 IF PEEK(344)=247 THEN X1=X1+
1 ELSE 332
328 SN=1:IF X1>XB THEN X1=XA+5:Y
1=Y1+1:IF Y1>15 THEN Y1=0
332 IF PEEK(341)=247 THEN Y1=Y1-
1 ELSE 340
336 IF Y1<YA THEN Y1=YB
340 IF PEEK(342)=247 THEN Y1=Y1+
1
344 IF Y1>YB THEN Y1=YA
348 X=Y1*32+X1
352 A$=INKEY$:IFA$="" THEN292
356 N= ASC(A$):IF N=94 OR N=8 OR
 N=9 OR N=10 THEN 292
360 IF ASC(A$)=95 THEN AC=2:SOUN
D100,1:GOTO388
364 IF ASC(A$)=91 THEN AC=3:SOUN
D100,1:GOTO388
368 IF ASC(A$)=21 THEN AC=4:SOUN
D100,1:GOTO388
372 IF ASC(A$)=93 THEN AC=5:SOUN
D100,1:GOTO388
376 IF ASC(A$)=13 THEN SOUND 100
,1:GOTO388
380 IF Y1>HY THEN HY=Y1
384 SOUND225,1:POKE X+&H400,ASC(
A$) OR &H40:X=X+1:SN=1:GOTO 292
388 RETURN
392 FOR J=X+1 TO SZ
396 ED$(J-1)=ED$(J):NEXT
400 ED$(SZ)="":RETURN
404 IF X>SZ - 17  THEN 420
408 FOR J=SZ-1 TO X+1 STEP -1
412 ED$(J+1)=ED$(J):NEXT
416 OD=OD+1
420 RETURN
424 IF X<OA OR X-OD>15  THEN 432

428 K=I+32*(X-OA)+5:FOR J=I+5 TO
 I+20:POKE K,PEEK(J):K=K+1:NEXT

432 RETURN
434 PRINT @448,"";:INPUT "OUTPUT
 TO PRINTER ";HH$
436 FORI=1TOXL:LB$(I)="":OB$(I)=
"":NEXT:FORI=XL+1TO SZ:OB$(I)=""
:NEXT
438 FOR TU=1 TO SZ:IF MID$(ED$(T
U),8,3)="END" THEN 440 ELSE NEXT

440 PC=0:LX=0:TU=64/TU:FOR I=0 T
O 63:SET(I,28,5):NEXT:I=1:TW=0:T
A=0
444 TA=TA+TB+TU:IF TA>=1 THEN TB
=TA-INT(TA):TA=INT(TA) ELSE 446
445 IF 63-TW-TA>=0 THEN FOR TK=0
 TO TA:RESET(63-TW-TK,28):NEXT:T
W=TW+TA:TA=0
446 WK$=INKEY$:IF WK$="A" THEN G
OSUB700:GOTO648
447 YB=0:PP=PC:IF LEFT$(ED$(I),1
)=" " THEN 464
448 IF LEFT$(ED$(I),1)="*" THEN5
92
452 P2$=HEX$(PC):Q=4:GOSUB1020
456 LB$(LX)=LEFT$(ED$(I),6)+P2$:
LX=LX+1:YB=1
460 IF LEN(ED$(I))=0 THEN 648
464 X=INSTR(8,ED$(I)," ")
468 IN$=MID$(ED$(I),8,X-8)
472 IF IN$="END" THEN GOSUB 700:
GOTO 648
476 OP$=RIGHT$(ED$(I),24-X):A$=L
EFT$(OP$,1):UX=1
480 IF IN$="ORG" THEN UY=1:GOSUB
506:PC=VAL(OP$):GOTO592
482 IF IN$="RMB" THEN UY=1:GOSUB
506:PC=PC+VAL(OP$):GOTO 592
484 IF IN$="FCB" OR IN$="FDB" OR
```

# OS-9 • 6809 • FLEX

The same **system software** on **FLEX, OS-9, SSB DOS, RS DOS** — offers **portability** and **easier learning** — for **Color Computer** and **SS-50** systems

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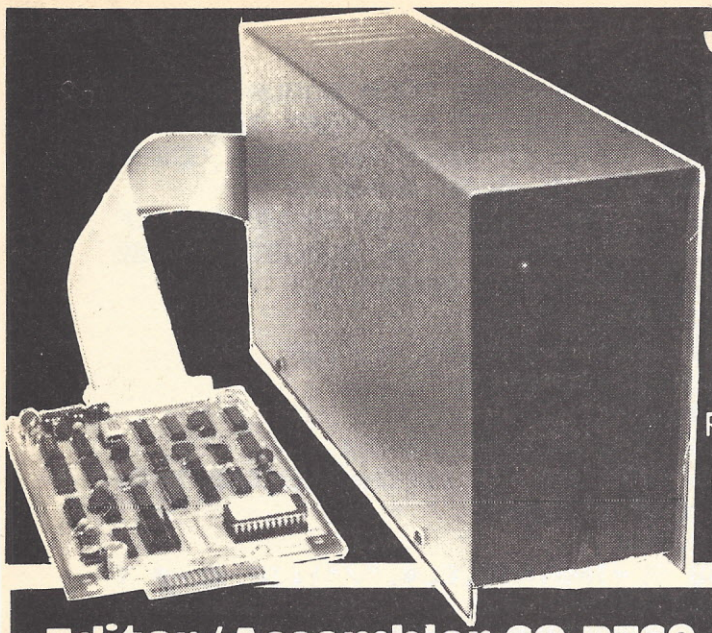
```
IN$="FCC"  THEN UY=1:GOSUB 506:G
OTO 596
488 IF IN$="EQU" THEN UY=1:GOSUB
 506:GOTO 632
492 IF LEFT$(IN$,1)="P" THEN GOS
UB 1028:M$="H":GOTO520
496 A$=LEFT$(OP$,1):IF A$=" " TH
EN M$="H":GOTO520
497 IF IN$="TFR" OR IN$="EXG" TH
EN GOSUB 944:M$="H":GOTO520
498 IF LEFT$(IN$,1)<>"B" AND LEF
T$(IN$,2)<>"LB" THEN 500
499 IF IN$<>"BITA" AND IN$<>"BIT
B" THEN OP$="+"+OP$:A$="+"
500 UX=2:IF A$="#" THEN M$="I" E
LSE IF A$="(" THEN M$="X" ELSE I
F A$="<" THEN M$="D" ELSE IF A$=
"+" THEN M$="R" ELSE UX=1:X=INST
R(1,OP$,","):IF X=0 THEN M$="E"
ELSE M$="X"
502 IF M$="R" THEN 520
504 A$=MID$(OP$,UX,1):IF (A$>"/"
 AND A$<":") OR A$="," THEN 520

505 UY=0:IF A$="-" OR A$="+" THE
N 520
506 IF A$="$" THEN MID$(OP$,UX)=
"&":OP$=LEFT$(OP$,UX)+"H"+RIGHT$
(OP$,LEN(OP$)-UX):IF UY=0 THEN 5
20
507 IF UY=1 THEN RETURN
508 IF A$<>"'" THEN 516 ELSE A$=
MID$(OP$,UX+1,1):A$=HEX$(ASC(A$)
):IF LEN(A$)=1 THEN A$="0"+A$
510 MID$(OP$,UX)="&H":OP$=LEFT$(
OP$,UX+1)+A$+RIGHT$(OP$,LEN(OP$)
-UX-1):GOTO 520
516 IF UX=1 THEN OP$="%"+OP$ ELS
E OP$=LEFT$(OP$,1)+"%"+RIGHT$(OP
$,LEN(OP$)-1)
520 IF M$<>"X" AND M$<>"E" AND M
$<> "R"  THEN OP$=RIGHT$(OP$,LEN
(OP$)-1)
524 P=0:F=0:RESTORE:FOR J=0 TO 2
55:READ IC$:X=INSTR(1,IC$,"/")
528 IF X=0 THEN 544
532 A$=LEFT$(IC$,X-1)
536 IF IN$<>A$THEN 544
540 IF MID$(IC$,X+1,1)=M$ THEN F
=1:GOTO556
544 NEXT:FOR J=1 TO 47:READ IC$:
X=INSTR(6,IC$,"/"):A$=MID$(IC$,6
,X-6):IF IN$<>A$THEN 552
548 IF MID$(IC$,X+1,1)=M$ THEN F
=1:P=VAL(RIGHT$(IC$,1)):J=VAL("&
H"+LEFT$(IC$,4)):GOTO556
552 NEXT
556 IF F=0 THEN OB$(I)="*no-op*"
:SOUND1,1:AC=0:GOTO 592
560 IF P=0 THEN AC=1:Q=2  ELSE A
C=2:Q=4
564 P2$=HEX$(J):GOSUB1020:OB$(I)
=P2$
568 IF M$<>"X" THEN IF P=0 THEN
AC=VAL(RIGHT$(IC$,1)) ELSE AC=P
 ELSE IF P<>0 THEN P=1
572 P2$=HEX$(PP):Q=4:GOSUB1020:O
B$(I)=P2$+OB$(I):IF M$="X" THEN
GOSUB 764:PC=PC+AC:GOTO 592
576 PC=PC+AC:IF P<>0 THEN P=1
580 IF LEFT$(OP$,1)="%" THEN IF
M$<>"H" AND M$<>"R" THEN OB$(I)=
OB$(I)+OP$:GOTO 592 ELSE OB$(I)=
OB$(I)+BB$:SOUND1,1:GOTO 592
584 IF LEFT$(OP$,1)="+" AND M$="
R" THEN OB$(I)=OB$(I)+OP$:GOTO59
2
588 IF M$<>"H" THEN X=VAL(OP$):P
2$=HEX$(X):Q=(AC-P)*2-2:GOSUB102
0:OB$(I)=OB$(I)+P2$ ELSE IF TQ=1
 THEN OB$(I)=OB$(I)+XT$:TQ=0
592 P=0:I=I+1:GOTO 444
596 P2$=HEX$(PP):Q=4:GOSUB1020:O
B$(I)=P2$:IF IN$="FCB" THEN PC=P
C+1:X=VAL(OP$) ELSE 612
600 IF X>255 OR X<-128 THEN OB$(
I)=OB$(I)+RR$:SOUND1,1:GOTO592
604 IF X<0 THEN X=255+X+1
608 P2$=HEX$(X):Q=2:GOSUB1020:OB
$(I)=OB$(I)+P2$:GOTO 592
612 IF IN$="FDB" THEN PC=PC+2:X=
VAL(OP$) ELSE 628
616 IF X>65535 OR X<-32768 THEN
OB$(I)=OB$(I)+RR$:SOUND1,1:GOTO5
92
620 IF X<0 THEN X=65535+X+1
624 P2$=HEX$(X):Q=4:GOSUB1020:OB
$(I)=OB$(I)+P2$:GOTO 592
628 IF IN$="FCC" THEN Q=1:FOR K=
2 TO LEN(OP$):A=ASC(MID$(OP$,K,1
)):IF A<>47 THEN P2$=HEX$(A):GOS
UB1020:OB$(I)=OB$(I)+P2$:PC=PC+1
 ELSE K=LEN(OP$)
629 NEXT:GOTO 592
632 IF YB=0 THEN OB$(I)=BB$:SOUN
D1,1:GOTO592
636 X=VAL(OP$):IF X>65535 OR X<-
32768 THEN LB$(LX-1)="":OB$(I)=R
R$:SOUND1,1:GOTO592
640 IF X<0 THEN X=65535+X+1
644 P2$=HEX$(X):Q=4:GOSUB1020:LB
$(LX-1)=LEFT$(LB$(LX-1),6)+P2$:G
OTO592
648 IF HH$="Y" THEN POKE 65494,0

652 CLS:P=0:FOR J=1 TO I
```

```
656 IF LEN(OB$(J))<>Ø THEN QB$=L
EFT$(OB$(J),4)+" "+RIGHT$(OB$(J)
,LEN(OB$(J))-4) ELSE QB$=""
66Ø IF HH$="Y" THEN PRINT #-2,QB
$;:PRINT #-2,TAB(15),ED$(J):GOTO
 68Ø
664 PRINT@P,QB$;:PRINT@P+15,ED$(
J);
668 IF J/16<>INT(J/16) THEN 676
672 A$=INKEY$:IF A$="" THEN 672
ELSE P=-32:CLS
676 P=P+32
68Ø NEXT
684 IF HH$="Y" THEN POKE 65495,Ø
:GOTO 696
688 A$=""
692 A$=INKEY$:IF A$="" THEN 692
696 RETURN
7ØØ OB$(I)="-END-":K=I:FOR I=1 T
O SZ:IF OB$(I)="-END-" THEN I=SZ
:GOTO 756
7Ø4 X=INSTR(1,OB$(I),"%"):IF X<>
Ø THEN M$="N":GOTO 716
7Ø8 AA$="":X=INSTR(1,OB$(I),"+")
:IF X<>Ø THEN M$="R":GOTO716
712 X=INSTR(1,OB$(I),"!"):IF X=Ø
 THEN 756 ELSE M$="R":AA$="P"
716 A$=MID$(OB$(I),X+1,6):IF LEN
(A$)<6 THEN A$=A$+STRING$(6-LEN(
A$)," ")
72Ø OB$(I)=LEFT$(OB$(I),X-1):A=L
EN(OB$(I))/2-2:F=Ø:FOR J=Ø TO LX
-1:B$=LEFT$(LB$(J),6):IF A$<>B$
THEN 748 ELSE IF M$="R" THEN 724
 ELSE OB$(I)=OB$(I)+MID$(LB$(J),
7,4):GOTO 744
724 IF MID$(OB$(I),5,1)="1" OR A
A$="P" THEN Q=4 ELSE Q=2
728 D1$="&H"+MID$(LB$(J),7,4):D1
=VAL(D1$):D2$="&H"+LEFT$(OB$(I),
4):D2=VAL(D2$):D1=D1-D2-A-Q/2
732 IF Q=2 AND (D1>127 OR D1<-12
8) THEN OB$(I)=OB$(I)+RR$:SOUND1
,1:GOTO 744 ELSE IF D1<-32768 OR
  D1>32767 THEN OB$(I)=OB$(I)+RR
$:SOUND1,1:GOTO 744
736 IF D1<Ø THEN IF Q=2 THEN D1=
255+D1+1 ELSE D1=65535+D1+1
74Ø P2$=HEX$(D1):GOSUB1Ø2Ø:OB$(I
)=OB$(I)+P2$
744 F=1:J=LX-1
748 NEXT
752 IF F=Ø THEN OB$(I)=OB$(I)+BB
$:SOUND1,1
756 NEXT
76Ø I=K:RETURN
764 N=Ø
768 Y=INSTR(1,OP$,"(")
```

```
772 IF Y=1 THEN OP$=RIGHT$(OP$,L
EN(OP$)-1)
776 X=INSTR(1,OP$,",")
780 IF X<>0 THEN 788
784 IF Y=1 THEN 908
788 IF X=1 THEN S1$="" ELSE S1$=
LEFT$(OP$,X-1)
792 S2$=RIGHT$(OP$,LEN(OP$)-X)
796 A$=LEFT$(S2$,1):AA$=A$
800 IF A$="X" THEN A=&H00:GOTO80
8 ELSE IF A$="Y" THEN A=&H20:GOT
O808 ELSE IF A$="U" THEN A=&H40:
GOTO808 ELSE IF A$="S" THEN A=&H
60:GOTO808 ELSE IF A$<>"P" THEN
OB$(I)=ER$:SOUND1,1:GOTO 940
804 A=&H00
808 IF S1$="A" THEN B=&H86:GOTO
888 ELSE IF S1$="B" THEN B=&H85:
GOTO888 ELSE IF S1$="D" THEN B=&
H8B:GOTO 888 ELSE IF S1$="" THEN
 B=&H84:GOTO848
812 IF LEFT$(S1$,1)="%" THEN N=4
:IF A$="P" THEN B=&H8D:GOTO 888
ELSE B=&H89:GOTO 888
816 N=VAL(S1$):NN=N:IF N<-32768
OR N>32767 THEN OB$(I)=RR$:SOUND
1,1:GOTO 940
820 IF N<-128 OR N>127 THEN 832
ELSE Q=2:IF N<0 THEN N=255+N+1
824 IF A$="P" THEN B=&H8C ELSE B
=&H88
828 GOTO 840
832 Q=4:IF N<0 THEN N=65535+N+1
836 IF A$="P" THEN B=&H8D ELSE B
=&H89
840 P2$=HEX$(N):GOSUB1020:N=Q
844 S1$="&H"+P2$:GOTO 888
848 X=INSTR(2,S2$,"+")
852 IF X=0 THEN 868
856 X=INSTR(X+1,S2$,"+")
860 IF X=0 THEN B=&H80:N=1 ELSE
B=&H81
864 GOTO 884
868 X=INSTR(2,S2$,"-")
872 IF X=0 THEN 884
876 X=INSTR(X+1,S2$,"-")
880 IF X=0 THEN N=1:B=&H82 ELSE
B=&H83
884 IF N=1 AND Y=1 THEN OB$(I)=E
R$:GOTO 940 ELSE GOTO 892
888 '
892 PB= A OR B:IF Y=1 THEN PB=PB
 OR &H10
896 IF N<>2 AND N<>4 THEN N=0
900 AC=P+2+N/2
904 P2$=HEX$(PB):Q=2:GOSUB1020:O
B$(I)=OB$(I)+P2$:GOTO 912
908 N=4:OB$(I)=OB$(I)+"9F":AC=4:
X=INSTR(1,OP$,")"):S1$=MID$(OP$,
1,X-1)
912 IF LEFT$(S1$,1)<>"%" THEN 92
4
916 IF AA$="P" THEN MID$(S1$,1,1
)="!"
920 OB$(I)=OB$(I)+S1$:GOTO940
924 IF N=0 THEN 940
928 A=VAL(S1$):Y=PB AND &H9F:IF
Y<>136 OR NN<-16 OR NN>15 THEN93
6 ELSE IF NN<0 THEN NN=31+NN+1
932 PB=(PB AND &H60) OR NN:AC=AC
-N/2:P2$=HEX$(PB):Q=2:GOSUB1020:
OB$(I)=LEFT$(OB$(I),LEN(OB$(I))-
N)+P2$:GOTO940
936 A=VAL(S1$):P2$=HEX$(A):Q=N:G
OSUB1020:OB$(I)=OB$(I)+P2$
940 RETURN
944 TQ=1:X=INSTR(1,OP$,",")
948 IF X=0 THEN XT$=ER$:SOUND1,1
:GOTO 984
952 R1$=LEFT$(OP$,1):R2$=MID$(OP
$,X+1,1)
956 X=INSTR(1,DR$,R1$):IF X=0 TH
EN XT$=ER$:SOUND1,1:GOTO 984
960 X=X-1:IF X>5 THEN X=X+2
964 P1$=HEX$(X)
968 X=INSTR(1,DR$,R2$):IF X=0 TH
EN XT$=ER$:SOUND1,1:GOTO 984
972 X=X-1:IF X>5 THEN X=X+2
976 P2$=HEX$(X)
980 XT$=P1$+P2$
984 RETURN
988 CLS:PRINT@196,"";:INPUT "FIL
E NAME";B$
992 GOSUB 1008
996 OPEN "O",-1,B$:FOR I=1 TO SZ
:IF OB$(I)="-END-" THEN I=SZ ELS
E PRINT #-1,OB$(I)
1000 NEXT:CLOSE -1
1004 POKE 65495,0:RETURN
1008 PRINT@484,"POSITION TAPE AN
D KEY IN";
1012 A$=INKEY$:IF A$="" THEN 101
2ELSE IF A$="M" THEN MOTORON:AUD
IOON:GOTO1012 ELSE IF A$="F" THE
N AUDIOOFF:MOTOROFF:GOTO1012 ELS
E POKE65494,0
1016 RETURN
1020 IF LEN(P2$)<Q THEN P2$=STRI
NG$(Q-LEN(P2$),"0")+P2$
1024 RETURN
1028 TQ=1:A=0:IF LEFT$(OP$,1)="
" THEN XT$="FF":GOTO1040 ELSE FO
R K=1TO LEN(OP$):A$=MID$(OP$,K,1
):IF A$="S" OR A$="U" THEN A$="K
"
1032 X=INSTR(1,ST$,A$):IF X<>0TH
```



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```
EN A=A OR 2^(X-1) ELSE IF A$="D"
 THEN A=A OR 6
1036 NEXT:P2$=HEX$(A):Q=2:GOSUB1
0200:XT$=P2$
1040 RETURN
```

---

```
2 CLEAR 200,27843
3 IZ=27843:IU=IZ+54:POKE IZ+1,&H
6C:POKE IZ+2,&HD2:POKE IZ+3,&H6C
:POKE IZ+4,&HDC
4 POKE 65495,0
6 DIM IC$(256):DIM PI$(48)
8 DEFUSR0=IZ+35:SZ=320:UR$="CABG
XY*P":VR$="DXYUSP":WR$="ABCG":TR
$="XYUS":RR$="CABGXYUS":RESTORE:
FOR I=1 TO 14:READ A$:NEXT:FOR I
=1 TO 100:READ A:IF A=999 THEN I
=100 ELSE POKE IZ+34+I,A
10 NEXT
12 FOR I=0 TO 255:READ IC$(I):NE
XT
14 FOR I=1 TO 50:READ PI$(I):IF
PI$(I)="*" THEN 18
16 NEXT
18 CLS:PRINT @8,"*dis-assembler*
":PRINT@486,"cOPYRIGHT BY RITA S
ABO";:PRINT@106,"1= LOAD":PRINT@
170,"2= DIS-ASS":PRINT@234,"3= S
AVE":PRINT@298,"4= MONITOR":PRIN
T@362,"5= END":PRINT:PRINTTAB(8)
:INPUT "option =  ";OP
20 IF OPC=1 THEN GOSUB 616 ELSE
IF OPC=2 THEN MM=0:GOSUB 40 ELSE
 IF OPC=3 THEN GOSUB 640 ELSE IF
 OPC=4 THEN GOSUB 24 ELSE IF OP=
5 THEN CLS:POKE 65494,0:END
22 GOTO 18
24 NT=0:SI=1:FL=0:SB=0:CLS:POKE
IZ+7,INT(IZ/256)+1:POKE IZ+8,&HF
4:POKE IZ+23,INT(IZ/256)+2:POKE
IZ+24,&HBC:RO=0
26 IF CM$<>"HE" THEN PRINT@64,""
;
27 SV=0:PRINT@0,"":PRINT@32,"":P
RINT@0,"";:INPUT "command";CM$
28 IF CM$="HE" THEN GOSUB 162 EL
SE IF CM$="EN" THEN RETURN ELSE
IF CM$="TO" THEN SI=1 ELSE IF CM
$="SF" THEN RO=1 ELSE IF CM$="SO
" THEN RO=0 ELSE IF CM$="TF" THE
N SI=0 ELSE SV=SV+1
30 IF CM$="DB" THEN PRINT@96,"B.
P. SET AT ";SB; ELSE SV=SV+1
32 IF CM$="SB" THEN GOSUB166:SB=
M1 ELSE IF CM$="DM" THEN GOSUB 1
66:GOSUB168 ELSE IF CM$="DR"  TH
EN SX=0:GOSUB588 ELSE SV=SV+1
34 IF CM$="SM" THEN GOSUB 166:GO
SUB186 ELSE IF CM$="SR" THENGOSU
B198 ELSE IF CM$="SA" THEN GOSUB
 166:AR=M1 ELSE SV=SV+1
36 IF CM$="GO" THEN GOSUB 166:IF
M1=-1 THEN 26 ELSE GOSUB300 ELSE
 IF SV=4 THEN SOUND 1,1
38 GOTO 26
40 INPUT "OFFSET = ";OF
42 AD=OF:UD=AD
44 CLS
45 LN=0:LP=-32:OD=AD
46 FOR I=1 TO 16:CN=PEEK(AD):C2=
0:EL$=IC$(CN)
47 P=0
48 SL=INSTR(1,EL$,"/"):IF SL=0 T
HEN SL=3
50 KW$=LEFT$(EL$,SL-1):IF KW$="P
2" OR KW$="P3" THEN GOSUB 80:IF
P=1 THEN GOTO48
52 IF KW$="?" THEN LN=1:MD$="?":
GOTO 56
54 MD$=MID$(EL$,SL+1,1):L$=RIGHT
$(EL$,1):LN=VAL(L$):IF MD$="X" T
HEN GOSUB96
56 LP=LP+32:LN=LN+C2:LL$=STRING$
(6," "):MID$(LL$,1,4)=HEX$(AD):L
L$=LL$+KW$:IF LN=1 THEN LL$=LL$+
STRING$(31-LEN(LL$)," "):GOTO 62

57 GOSUB 800
58 LL$=LL$+" "+KK$:LL$=LL$+STRIN
G$(31-LEN(LL$)," ")
59 IF MD$="R" THEN IF LEFT$(KW$,
1)="L" THEN FQ=1 ELSE FQ=2
60 IF FQ<>0 THEN GOSUB 102:P2$=H
EX$(QQ):Q=4:GOSUB680:MID$(LL$,26
,4)=P2$
62 MID$(LL$,31,1)=MD$:IF MM=0 TH
EN PRINT@LP,LL$; ELSE RETURN
64 AA=AD:AD=AD+LN
66 IF KW$="P1" OR KW$="P2" THEN
AD=AD+1
68 NEXT
70 D$=INKEY$:IF D$="" THEN 70
72 IF ASC(D$)=93 THEN78 ELSE IF
D$="0" THEN CLS:GOTO40 ELSE IF A
SC(D$)=21 THEN DS=0:AA=OF:GOTO 7
6 ELSE IF ASC(D$)=91 THEN DS=0:A
A=UD:GOTO 76 ELSE IF ASC(D$)=95
THEN 75 ELSE IF D$<>"P" THEN 76
73 SCREEN 0,1:POKE 65494,0:FOR P
P=1024 TO 1535 STEP 32:D$="":FOR
 PW=PP TO PP+31:A=PEEK(PW):IF A<
60 OR A>90 THEN A=A AND &HBF
74 D$=D$+CHR$(A):NEXT:PRINT #-2,
D$:NEXT:POKE 65495,0:SCREEN 0,0:
GOTO 70
```

```
75 DS=LN
76 AD=AA+DS:UD=OD:GOTO 44
78 RETURN
80 P=0:T=PEEK(AD+1):T1$=HEX$(T):
IF LEN(T1$)=1 THEN T1$="0"+T1$
82 T2$=HEX$(CN):IF LEN(T2$)=1 TH
EN T2$="0"+T2$
84 T1$=T2$+T1$
86 FOR II=1 TO 50
88 T$=PI$(II):IF T$="*" THEN 92
90 T2$=LEFT$(T$,4):IF T1$=T2$ TH
EN EL$=MID$(T$,6,LEN(T$)-5):P=1:
GOTO94
91 NEXT
92 EL$="?"
94 RETURN
96 C3=PEEK(AD+C2+1+P):C3=C3 AND
159:IF C3=&H88 OR C3=&H8C OR C3=
&H98 OR C3=&H9C THEN C2=C2+1
98 IF C3=&H89 OR C3=&H8D OR C3=&
H99 OR C3=&H9D OR C3=&H9F THEN C
2=C2+2
99 IF C3=&H8C OR C3=&H8D OR C3=&
H9C OR C3=&H9D THEN FQ=1
100 RETURN
102 QQ=PEEK(AD+LN-1):IF FQ=1 THE
N QQ=QQ+256*PEEK(AD+LN-2)
104 IF QQ>127 THEN IF QQ<256 THE
N QQ=NOT 255-QQ ELSE IF QQ>32767
 THEN QQ=NOT 65535-QQ
106 QQ=AD+LN+QQ:FQ=0
108 RETURN
110 DATA "HE=HELP","TO=TRACE","T
F=NO/TRACE","SF=SUBROUT/OFF","SO
=SUBROUT/ON","SA=SET ARG.","SB=S
ET B.P.","DB=DISP B.P","SM=SET M
EM","DM=DISP MEM","SR=SET REG","
DR=DISP REG","GO=EXEC","EN=END"
112 DATA &HEF,&H8D,&HFF,&HE2,&H1
0,&HEF,&H8D,&HFF,&HDF,&H10,&HEE,
&H8D,&HFF,&HD0,&H35,&H7F,&H32,&H
F8,&HEE,&H12,&H12,&H12,&H12,&H12
,&H20,&H12,&H36,&H01,&H10,&HEF,&
H8D,&HFF,&HC3
116 DATA &H10,&HCE,&H00,&H01,&H1
0,&HEF,&H8D,&HFF,&HB8,&H20,&H07,
&H36,&H01,&H10,&HEF,&H8D,&HFF,&H
B1,&H10,&HEE,&H8D,&HFF,&HA8,&H37
,&H01,&H34,&H7F,&HEE,&H8D,&HFF,&
HA6,&H10,&HEE,&H8D,&HFF,&HA3,&H3
9,999
120 DATA NEG/D2,?,?,COM/D2,LSR/D
2,?,ROR/D2,ASR/D2,ASL/D2,ROL/D2,
DEC/D2,?,INC/D2,TST/D2,JMP/D2,CL
R/D2,P2,P3,NOP/H1,SYNC/H1,?,?,LB
RA/R3,LBSR/R3,?,DAA/H2,ORCC/I2,?
,ANDCC/I2,SEX/H1,EXG/H2,TFR/H2
124 DATA BRA/R2,BRN/R2,BHI/R2,BL
S/R2,BHS/R2,BLO/R2,BNE/R2,BEQ/R2
,BVC/R2,BVS/R2,BPL/R2,BMI/R2,BGE
/R2,BLT/R2,BGT/R2,BLE/R2
126 DATA LEAX/X2,LEAY/X2,LEAS/X2
,LEAU/X2,PSHS/H2,PULS/H2,PSHU/H2
,PULU/H2,?,RTS/H1,ABX/H1,RTI/H1,
CWAI/H2,MUL/H1,?,SWI/H1,NEGA/H1,
?,?,COMA/H1,LSRA/H1,?,RORA/H1,AS
RA/H1,ASLA/H1,ROLA/H1,DECA/H1,?,
INCA/H1,TSTA/H1,?,CLRA/H1
130 DATA NEGB/H1,?,?,COMB/H1,LSR
B/H1,?,RORB/H1,ASRB/H1,ASLB/H1,R
OLB/H1,DECB/H1,?,INCB/H1,TSTB/H1
,?,CLRB/H1,NEG/X2,?,?,COM/X2,LSR
/X2,?,ROR/X2,ASR/X2,ASL/X2,ROL/X
2,DEC/X2,?,INC/X2,TST/X2,JMP/X2,
CLR/X2
134 DATA NEG/E3,?,?,COM/E3,LSR/E
3,?,ROR/E3,ASR/E3,ASL/E3,ROL/E3,
DEC/E3,?,INC/E3,TST/E3,JMP/E3,CL
R/E3,SUBA/I2,CMPA/I2,SBCA/I2,SUB
D/I2,ANDA/I2,BITA/I2,LDA/I2,?,EO
RA/I2,ADCA/I2,ORA/I2,ADDA/I2,CMP
X/I2,BSR/R2,LDX/I3,?
138 DATA SUBA/D2,CMPA/D2,SBCA/D2
,SUBD/D2,ANDA/D2,BITA/D2,LDA/D2,
STA/D2,EORA/D2,ADCA/D2,ORA/D2,AD
DA/D2,CMPX/D2,JSR/D2,LDX/D2,STX/
D2
140 DATA SUBA/X2,CMPA/X2,SBCA/X2
,SUBD/X2,ANDA/X2,BITA/X2,LDA/X2,
STA/X2,EORA/X2,ADCA/X2,ORA/X2,AD
DA/X2,CMPX/X2,JSR/X2,LDX/X2,STX/
X2
142 DATA SUBA/E3,CMPA/E3,SBCA/E3
,SUBD/E3,ANDA/E3,BITA/E3,LDA/E3,
STA/E3,EORA/E3,ADCA/E3,ORA/E3,AD
DA/E3,CMPX/E3,JSR/E3,LDX/E3,STX/
E3
144 DATA SUBB/I2,CMPB/I2,SBCB/I2
,ADDD/I3,ANDB/I2,BITB/I2,LDB/I2,
?,EORB/I2,ADCB/I2,ORB/I2,ADDB/I2
,LDD/I3,?,LDU/I3,?
146 DATA SUBB/D2,CMPB/D2,SBCB/D2
,ADDD/D2,ANDB/D2,BITB/D2,LDB/D2,
STB/D2,EORB/D2,ADCB/D2,ORB/D2,AD
DB/D2,LDD/D2,STD/D2,LDU/D2,STU/D
2
148 DATA SUBB/X2,CMPB/X2,SBCB/X2
,ADDD/X2,ANDB/X2,BITB/X2,LDB/X2,
STB/X2,EORB/X2,ADCB/X2,ORB/X2,AD
DB/X2,LDD/X2,STD/X2,LDU/X2,STU/X
2
150 DATA SUBB/E3,CMPB/E3,SBCB/E3
,ADDD/E3,ANDB/E3,BITB/E3,LDB/E3,
STB/E3,EORB/E3,ADCB/E3,ORB/E3,AD
DB/E3,LDD/E3,STD/E3,LDU/E3,STU/E
3
```

```
154 DATA 1021/LBRN/R4,1022/LBHI/
R4,1023/LBLS/R4,1024/LBHS/R4,102
5/LBCS/R4,1026/LBNE/R4,1027/LBEQ
/R4,1028/LBVC/R4,1029/LBVS/R4,10
2A/LBPL/R4,102B/LBMI/R4,102C/LBG
E/R4,102D/LBLT/R4,102E/LBGT/R4,1
02F/LBLE/R4
156 DATA 103F/SWI2/H2,1083/CMPD/
I4,108C/CMPY/I4,108E/LDY/I4,1093
/CMPD/D3,109C/CMPY/D3,109E/LDY/D
3,109F/STY/D3,10A3/CMPD/X3,10AC/
CMPY/X3,10AE/LDY/X3,10AF/STY/X3,
10B3/CMPD/E4,10BC/CMPY/E4,10BE/L
DY/E4,10BF/STY/E4
160 DATA 10CE/LDS/I4,10DE/LDS/D3
,10DF/STS/D3,10EE/LDS/X3,10EF/ST
S/X3,10FE/LDS/E4,10FF/STS/E4,113
F/SWI3/H2,1183/CMPU/I4,118C/CMPS
/I4,1193/CMPU/D3,119C/CMPS/D3,11
A3/CMPU/X3,11AC/CMPS/X3,11B3/CMP
U/E4,11BC/CMPS/E4,*
162 CLS:RESTORE
164 PO=64:FOR I=1 TO 14:READ A$:
PRINT@PO,A$;:PO=PO+32:NEXT:RETUR
N
166 PRINT@32,"";:INPUT "ADDRESS"
;M1:IF M1>-1 AND M1<&HFFFF THEN
RETURN ELSE IF M1=-1 AND CM$="GO
" THEN RETURN ELSE SOUND 1,1:GOT
O 166
168 PRINT@64,"";:INPUT "B/W,1-8,
N/A/X";F$,N,R$
170 IF N<1 THEN N=1
172 IF N>8 THEN N=8
174 PO=96:Q=2:QQ=1:IF F$="W" THE
N QQ=2:IF N/2 <> INT(N/2) THEN N
=N-1
176 FOR K=M1 TO M1-1+N*QQ STEP Q
Q:P2$=HEX$(PEEK(K)):GOSUB680:A$=
P2$
178 IF QQ=2 THEN P2$=HEX$(PEEK(K
+1)):GOSUB680:A$=A$+P2$
180 A=VAL("&H"+A$):IF R$="N" THE
N IF R$="B" THEN IF A>127 THEN A
=A-255-1 ELSE 182 ELSE IF A>3276
7 THEN A=A-&HFFFF-1
182 IF R$="N" THEN A$=STR$(A) EL
SE IF R$="A" THEN IF F$="B" THEN
 A$=CHR$(A)
184 PRINT@PO,A$:PO=PO+8:NEXT:RET
URN
186 PRINT@32,"";:INPUT "B/W,VALU
E";F$,N
188 IF F$="W" AND N>&HFFFF OR N<
-32768 THEN SOUND 1,1:GOTO 196
190 IF F$="B" AND N>255 OR N<-12
8 THEN SOUND 1,1:GOTO 196
192 IF N<0 THEN IF F$="B" THEN N
=255+N+1 ELSE N=&HFFFF+N+1
194 IF F$="B" THEN POKE M1,N ELS
```

# Telewriter-64™

## the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

### THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

*...one of the best programs for the Color Computer I have seen...*
— Color Computer News, Jan. 1982

### TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

### 64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

### 64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.
The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

### RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.
Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

### FEATURES & SPECIFICATIONS:

**Printing and formatting:** Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

**File and I/O Features:** ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

**Editing features:** Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

*...truly a state of the art word processor... outstanding in every respect.*
— The RAINBOW, Jan. 1982

### PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.
Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)
To order, send check or money order to:

Cognitec
704 Nob Street
Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add $2 for shipping. Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Telewriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners: send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

```
E POKE M1,INT(N/256):POKE M1+1,N
-INT(N/256)*256
196 RETURN
198 PRINT@32,"";:INPUT "REGISTER
";R$
200 IF R$="D" THEN 204 ELSEA$=R$

202 X=INSTR(1,RR$,A$):IF X=0 THE
N SOUND 1,1:GOTO210
204 PRINT@64,"";:INPUT "VALUE";M
1:N=M1:F$="W":IF R$="D" THEN M1=
IZ+16:GOTO208 ELSE IF R$="S" THE
N M1=IZ+7:GOTO208
206 IF X>4 THEN M1=IZ+9+X*2 ELSE
 F$="B":M1=IZ+14+X
208 GOSUB 188:SX=0:GOSUB588
210 RETURN
299 'monitor routine
300 IF FL=0 AND M1=0 THEN SOUND
1,1:RETURN
302 'initialization area
304 DX=7:QQ=0:FL=FL+1:IF M1<>0 T
HEN PC=M1
307 'calls disassemble
308 RU=0:SX=0:MM=1:OF=PC:GOSUB 4
2:T$=MID$(LL$,31,1)
312 IF SB=PC THEN IF SO<>PC THEN
 SO=PC:GOTO 584 ELSE SO=0
316 FOR I=IU TO IU+4:POKE I,18:N
EXT:PA=PC+LN:CF=0:POKE IZ+6,0
319 'place instruction in execut
ion area
320 FOR I=0 TO LN-1:POKE IU+I,PE
EK(PC+I):NEXT
324 'tfr or exg with pc involved
?
328 IF KW$<>"TFR" AND KW$<>"EXG"
 THEN 356
332 A=PEEK(IU+1):B=A AND &H55:IF
 B<>&H50 AND B<>&H05 AND B<>&H55
 THEN 488
336 IF B=&H50 THEN A=A AND &H0F:
IF A = &H03 THEN QX=IZ+19:POKE I
U+1,A OR &H10:GOTO 344 ELSE QX=I
Z+23:POKE IU+1,A OR &H30:GOTO 34
4
340 A = A AND &HF0:IF A = &H30 T
HEN QX=IZ+19:POKE IU+1,A OR &H01
 ELSE QX=IZ+23:POKE IU+1,A OR &H
03
344 U1=PEEK(QX):U2=PEEK(QX+1):PO
KE QX,INT(PA/256):POKE QX+1,PA-I
NT(PA/256)*256
348 CF=9:GOTO 488
352 'checks if relative branch
356 IF T$<>"R" THEN 392
360 'place absolute address in r
a
364 RA=VAL("&H"+MID$(LL$,26,4))
368 'if branch to subroutine the
n push pc in stack s
372 IF KW$="BSR" OR KW$="LBSR" T
HEN IS=-2:PN=PA:QQ=1:GOSUB 692:P
A=RA:NT=NT+1:GOTO 492
376 'if conditional branch chang
e tag address
380 CF=1:IF LEFT$(KW$,1)="L" THE
N POKE IU+LN-2,0:POKE IU+LN-1,3
ELSE POKE IU+1,5
384 GOTO 488
388 'rts no execute
392 IF KW$="RTS" THEN NT=NT-1:IF
 NT<0 THEN 608 ELSE CF=2:GOTO 49
2
396 'rti change it for puls
400 IF KW$="RTI" THEN NT=NT-1:IF
 NT<0 THEN 608 ELSE POKE IU,&H35
:POKE IU+1,&H7F:CF=2:GOTO 488
404 'pull or push check if they
are dealing with pc
408 IF LEFT$(KW$,3)="PUS" THEN I
F (PEEK(IU+1) AND &H80) <> 0 THE
N POKE IU+1,(PEEK(IU+1) AND &H7F
):CF=3:GOTO 488 ELSE 488
412 IF LEFT$(KW$,3)="PUL" THEN I
F (PEEK(IU+1) AND &H80) <>0 THEN
 POKE IU+1,(PEEK(IU+1) AND &H7F)
:CF=4:GOTO 488 ELSE 488
416 IF KW$<>"JSR" AND KW$<>"JMP"
 THEN 436
420 'if jmp or jsr check if they
 are indexed
424 IF T$="X" THEN CF=6:GOTO 436
 ELSE CF=5:A=PEEK(PC+1):IF T$<>"
D" THEN PX=A*256+PEEK(PC+2) ELSE
PX=PEEK(IZ+18)*256+A
428 GOTO 492
432 'handling of indexed jsr/jmp
 and indexed with pc
436 IF T$<>"X" THEN 488 ELSE PB=
IU:IF PEEK(PB)=&H10 OR PEEK(PB)=
&H11 THEN PB=PB+2 ELSE PB=PB+1
440 'if indexed to pc get absolu
te address
444 A=PEEK(PB):IF A=&H8C OR A=&H
8D OR A=&H9C OR A=&H9D THEN CF=C
F+7:RA=VAL("&H"+MID$(LL$,26,4))
448 IF CF<6 THEN 488
452 IF CF=6 THEN G=&HEE,QX=IZ+23
:GOTO 468
456 'change indexing to u or x l
oad address in u or x
460 POKE PB+1,0:POKE PB+2,0:QX=I
Z+23:POKE PB,PEEK(PB) AND &H90:P
OKE PB,PEEK(PB) OR &H09:A=INSTR(
1,KW$,"U")
```

```
464 IF A<>Ø THEN QX=IZ+19:G=&HAE
 ELSE G=PEEK(PB) OR &H4Ø:POKE PB
,G:G=&HEE
468 U1=PEEK(QX):U2=PEEK(QX+1):C=
PEEK(IZ+1Ø)
472 IF CF<> 6 THEN POKE QX,INT(R
A/256):POKE QX+1,RA-INT(RA/256)*
256
476 IF CF<>7 THEN POKE IU,G
48Ø IF CF=13 THEN CF=8
484 'execute pseudo-routine
488 A=USRØ(AR)
492 ON CF+1 GOTO 572,5ØØ,512,52Ø
,532,552,544,568,544,568
496 'conditional branchs
5ØØ IF PEEK(IZ+6)=1 THEN PA=RA
5Ø4 GOTO 572
5Ø8 'rts and rti
512 IS=2:GOSUB 692:PA=PV:GOTO 57
2
516 'pull
52Ø IF RIGHT$(KW$,1)="U" THEN DX
=23
524 IS=-2:QQ=1:PN=PA:GOSUB 692:G
OTO 572
528 'push
532 IF RIGHT$(KW$,1)="U" THEN DX
=23
536 IS=2:GOSUB 692:PA=PV:GOTO 57
2
54Ø 'also jsr/jmp indexed
544 PX=PEEK(QX)*256+PEEK(QX+1)
548 'jmp and jsr not-indexed
552 IF KW$="JSR" THEN NT=NT+1:IS
=-2:QQ=1:PN=PA:GOSUB 692:PA=PX
556 IF CF=5 THEN PA=PX:GOTO 572
56Ø POKE (IZ+1Ø),C
564 'indexed to pc
568 POKE QX,U1:POKE QX+1,U2
572 PC=PA
574 IF KW$="JSR" AND RO=1 THEN P
OKE IU,&HBØ:POKE IU+1,INT(PC/256
):POKE IU+2,PC-INT(PC/256)*256:N
T=NT-1:QQ=Ø:IS=2:GOSUB 692:PC=PV
:A=USRØ(Ø)
576 'display regs and continue
58Ø IF SI=Ø THEN SX=2:GOTO596 EL
SE SX=1
584 PRINT@16Ø,LL$
588 C=PEEK(IZ+15):A=PEEK(IZ+16):
B=PEEK(IZ+17):D=A*256+B:G=PEEK(I
Z+18):S=PEEK(IZ+7)*256+PEEK(IZ+8
):U=PEEK(IZ+23)*256+PEEK(IZ+24):
X=PEEK(IZ+19)*256+PEEK(IZ+2Ø):Y=
PEEK(IZ+21)*256+PEEK(IZ+22)
592 PRINT@192,"C=";C,HEX$(C);:PR
INT@224,"A=";A,HEX$(A);:PRINT@25
6,"B=";B,HEX$(B);:PRINT@288,"D="
;D,HEX$(D):PRINT@32Ø,"G=";G,HEX$
(G):PRINT@352,"X=";X,HEX$(X):PRI
NT@384,"Y=";Y,HEX$(Y):PRINT@416,
"S=";S,HEX$(S):PRINT@448,"U=";U,
HEX$(U)
596 PRINT@48Ø,"P=";PC,HEX$(PC);
6ØØ ON SX+1 GOTO 612,6Ø4,3Ø8
6Ø4 A$=INKEY$:IF A$="" THEN 6Ø4
ELSE IF A$<>"E" THEN 3Ø8 ELSE 61
2
6Ø8 NT=Ø:PRINT@128," END OF ROUT
INE "
612 RETURN
616 CLS:PRINT@2ØØ,"";:INPUT "FIL
E NAME ";B$:INPUT "          OFFSE
T ";OO:GOSUB 668:OPEN "I",-1,B$:
FOR I=1 TO SZ:IF EOF(-1) THEN I=
SZ:GOTO632 ELSE LINE INPUT #-1,O
B$:IF OB$="-END-" THEN I=SZ:GOTO
632
62Ø X=INSTR(1,OB$,"*"):IF X<>Ø O
R OB$=""  THEN 632
624 A$="&H"+LEFT$(OB$,4):OB$=RIG
HT$(OB$,LEN(OB$)-4)
628 K=Ø:A=VAL(A$)+OO:FOR J=1 TO
LEN(OB$)-1 STEP 2:B$="&H"+MID$(O
B$,J,2):B=VAL(B$):POKE A+K,B:K=K
+1:NEXT
632 NEXT
636 RETURN
64Ø CLS:PRINT@196,"";:INPUT "FIL
E NAME";B$:INPUT "START ADDRESS"
;I:INPUT "END ADDRESS";J:INPUT "
EXECUTE ADDRESS";K
644 IF I=Ø THEN I=15872
648 IF J=Ø THEN J=16384
652 IF K=Ø THEN K=I
656 GOSUB 668
66Ø CSAVEM B$,I,J,K
664 POKE 65495,Ø:RETURN
668 PRINT@484,"POSITION TAPE AND
 KEY IN";
672 A$=INKEY$:IF A$="" THEN 672E
LSE IF A$="M" THEN MOTORON:AUDIO
ON:GOTO672 ELSE IF A$="F" THEN A
UDIOOFF:MOTOROFF:GOTO672 ELSE PO
KE65494,Ø
676 RETURN
68Ø IF LEN(P2$)<Q THEN P2$=STRIN
G$(Q-LEN(P2$),"Ø")+P2$
684 RETURN
688 'push or pull emulator
692 SS=PEEK(IZ+DX)*256+PEEK(IZ+D
X+1):PV=PEEK(SS)*256+PEEK(SS+1):
SS=SS+IS
696 POKE IZ+DX,INT(SS/256):POKE
IZ+DX+1,SS-INT(SS/256)*256
7ØØ IF QQ=Ø THEN 7Ø8
```

```
704 POKE SS,INT(PN/256):POKE SS+
1,PN-INT(PN/256)*256
708 DX=7:QQ=0
712 RETURN
800 DD$="":KK$="":RP$="":YR$=""
802 IF CN=16 OR CN=17 THEN B=LN-
2:II=AD+2 ELSE II=AD+1:B=LN-1
810 IF MD$="X" THEN 840 ELSE KK$
="$":B=B-1:IF MD$="D" THEN KK$="
<"+KK$ ELSE IF MD$="I" THEN KK$=
"#"+KK$
820 IF LEFT$(KW$,1)<>"P" AND KW$
<>"EXG" AND KW$<>"TFR" THEN 972
ELSE KK$=""
840 B=PEEK(II):II=II+1
844 IF LEFT$(KW$,1)<>"P" THEN 86
0
848 FOR JJ=8 TO 1 STEP -1
849 A=INT(2^(JJ-1))
850 A=B AND A:IF A=0 THEN 854
852 DD$=DD$+MID$(UR$,JJ,1)
854 NEXT
856 GOTO 996
860 IF KW$<>"EXG" AND KW$<>"TFR"
 THEN 880 ELSE A$=HEX$(B):IF LEN
(A$)=1 THEN A$="0"+A$
862 A=VAL("&H"+LEFT$(A$,1)):IF A
>7 THEN A=A-8:B$=WR$ ELSE B$=VR$

864 DD$=MID$(B$,A+1,1)+","
866 A=VAL("&H"+RIGHT$(A$,1)):IF
A>7 THEN A=A-8:B$=WR$ ELSE B$=VR
$
868 DD$=DD$+MID$(B$,A+1,1)
870 GOTO 996
880 IF B=&H9F THEN KK$="(":RP$="
)":B=1:GOTO 972
884 A=B AND &H0C
888 IF A=12 THEN A=B AND &H80:IF
 A <>0 THEN YR$="PC":GOTO 968
892 A$=HEX$(B AND &H60):A=0:IF L
EN(A$)=2 THEN A=INT(VAL(LEFT$(A$
,1))/2)
896 YR$=MID$(TR$,A+1,1)
900 A=B AND &H80:IF A<>0 THEN 92
0 ELSE  A =B AND &H1F:A$=HEX$(A)
:YR$=","+YR$
904 IF LEN(A$)=1 THEN A$="0"+A$
908 IF LEFT$(A$,1)="1" THEN A=-1
6 ELSE A=0
912 A=VAL("&H"+RIGHT$(A$,1))+A:I
F A<0 THEN A$="-":A=A*-1 ELSE A$
=""
916 DD$=A$+STR$(A):GOTO 996
920 A=B AND &H10
924 IF A=&H10 THEN KK$="(":RP$="
)"
928 A=B AND &H0F
932 ON A+1 GOTO 940,944,948,952,
956,960,964,968,968,968
936 KK$=KK$+"D,":GOTO 996
940 YR$=","+YR$+"+":GOTO 996
944 YR$=","+YR$+"++":GOTO 996
948 YR$=",-"+YR$:GOTO 996
952 YR$=",--"+YR$:GOTO 996
956 YR$=","+YR$:GOTO 996
960 KK$=KK$+"B,":GOTO 996
964 KK$=KK$+"A,":GOTO 996
968 YR$=","+YR$:KK$=KK$+"$"
972 DD$=HEX$(PEEK(II))
976 IF LEN(DD$)=1 THEN DD$="0"+D
D$
980 A=B AND &H01
984 A$="":IF A=1 THEN A$=HEX$(PE
EK(II+1))
988 IF LEN(A$)=1 THEN A$="0"+A$
992 DD$=DD$+A$
996 KK$=KK$+DD$+YR$+RP$
1000 RETURN
```

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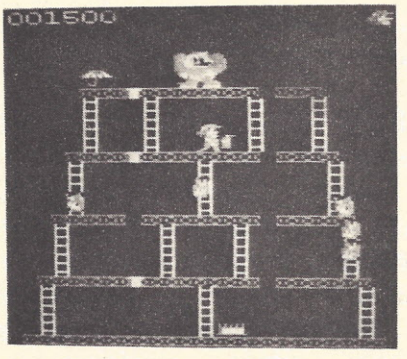


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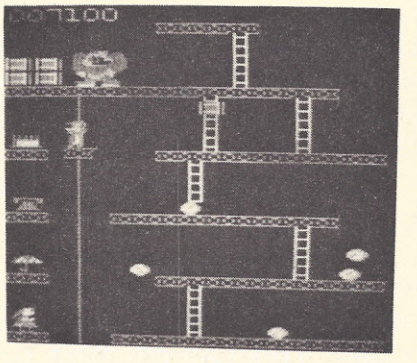


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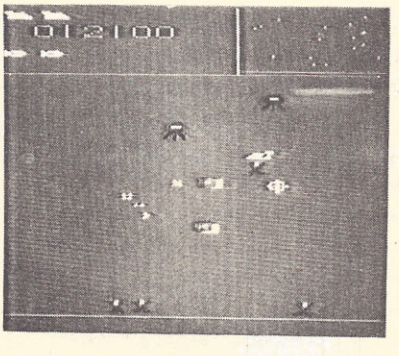


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# SUPER TAPE ERASER

by James L. Payette
Box 250
Echo Bay
Ontario, Canada P0S 1C0

Some of those I/O errors could be coming from poor quality tapes or tapes not properly erased. So why not build ''Super Tape Eraser'' and get rid of those I/O error blues? This device is an extra powerful magnetic tape eraser that may be easily built using parts from the proverbial junkbox (or scrapped TV); and a few hours work. The main ingredient needed is a power transformer and the bigger the better. You must determine if this transformer is good electrically. This can be done by measuring the primary resistance or applying power to the appropriate windings and identifying and marking the primary winding leads. You can then cut off short or tape up all other windings as they will not be used for this project. A brief explanation of the modifications needed to the transformer is as follows: (1) Take a good power transformer and determine the primary winding. (2) Remove all core laminations. These are 'E' shaped steel pieces mounted in the transformer facing each other as per DWG(A). (3) Replace all 'E' laminations making sure that they are all facing in the same direction as per DWG(B). (4) Wire up an A.C. line cord, indicating light, and on/off switch as per DWG(C). (5) Mount the modified transformer in a box or bread board as desired.

## MODIFICATION INSTRUCTIONS

After removing any covers on the transformer, and properly identifying the primary leads; you may start removing the core laminations. This can easily be done with a hammer and a chisel or old screwdriver. Be careful not to cut or damage the windings while performing this operation. There will be a flat steel piece across each end of the 'E' laminations. These may be removed and discarded. After removing all laminations you may wish to remove one or two outer windings that will not be used. This may help you to insert the laminations more easily. At this time you may wish to tape or insulate any exposed wiring, so as the steel laminations will not make contact with the windings. You may now replace the laminations making sure they're now facing all in the same direction. You may not be able to replace every single piece but try to put back as many as possible. At this stage you may want to try it out.

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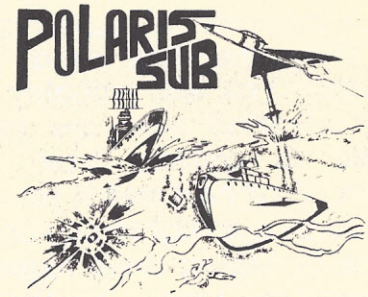


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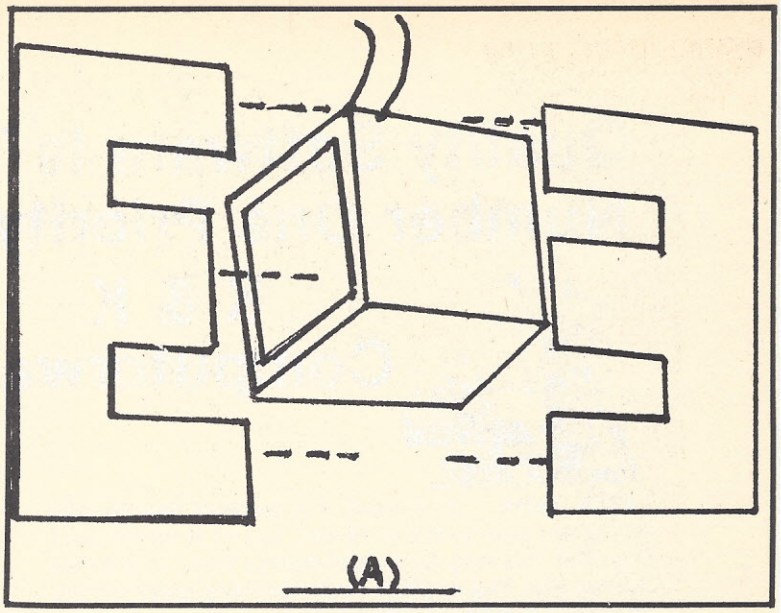
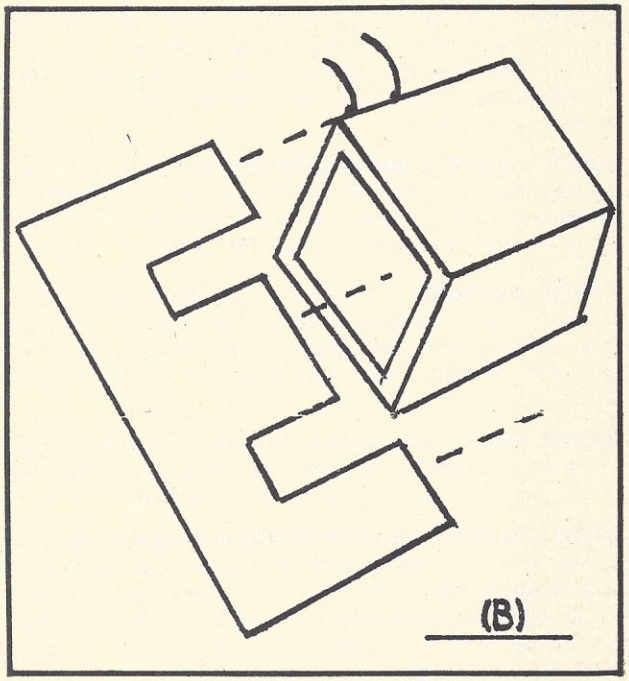
## SUPER TAPE ERASER

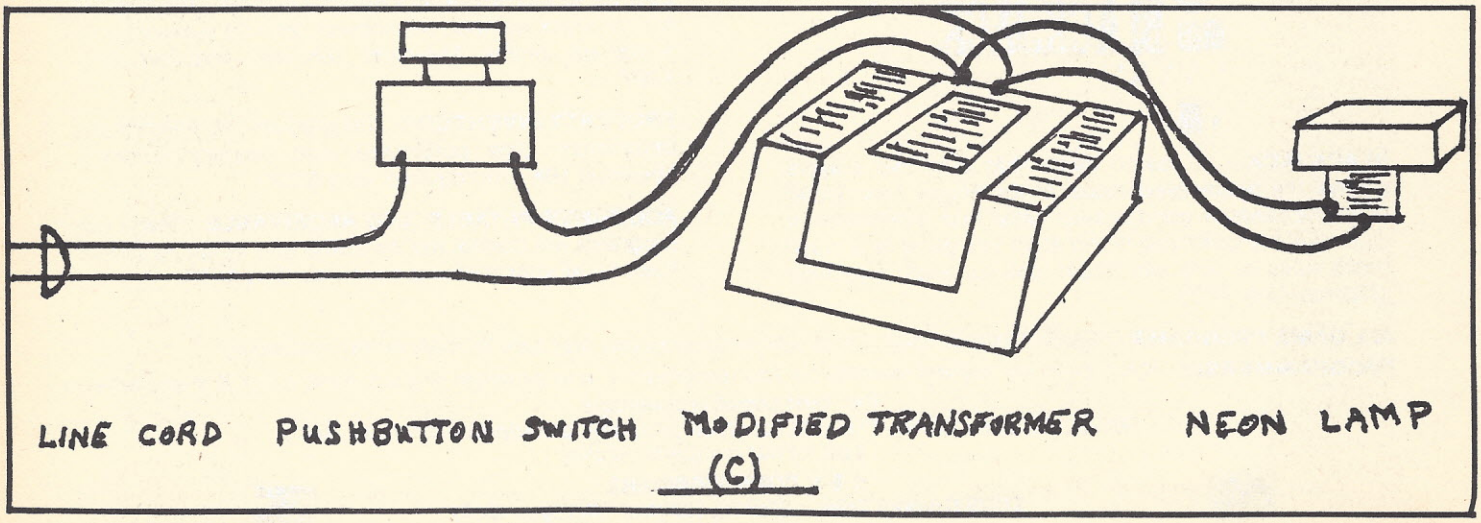
Connect a line cord to the primary leads and place the transformer on a clean dry wooden surface. Plug the line cord into 110V AC(standard). You will probably get a loud hum and vibration from the transformer. This noise is coming from the loose laminations. Your next step if you wish to get rid of this noise is to tighten up or secure the laminations by taping them together with a good fiberglass tape. Another way of accomplishing this would be to place the transformer in a plastic or wooden box and pour epoxy or fiberglass resin to encapsulate the complete tranformer (making sure the primary leads are free). This assembly may now be placed in a suitable box or enclosure leaving room for a light and a switch. The addition of the switch is optional but if one is added you must make sure that it is capable of handling the heavy currents which may be in the order of 3-8 AMPS depending on the transformer used. After all these modifications are complete you will have a super powerful tape demagnetizer (eraser) that will be second to none on the market. This eraser may also be used for demagnetizing audio and video tapes as well as your computer tapes.




*COLOR COMPUTER NEWS TIP*

To convert Hex numbers to decimal try the following "PRINT &Hnumber" The result will be the hex number printed in base 10.



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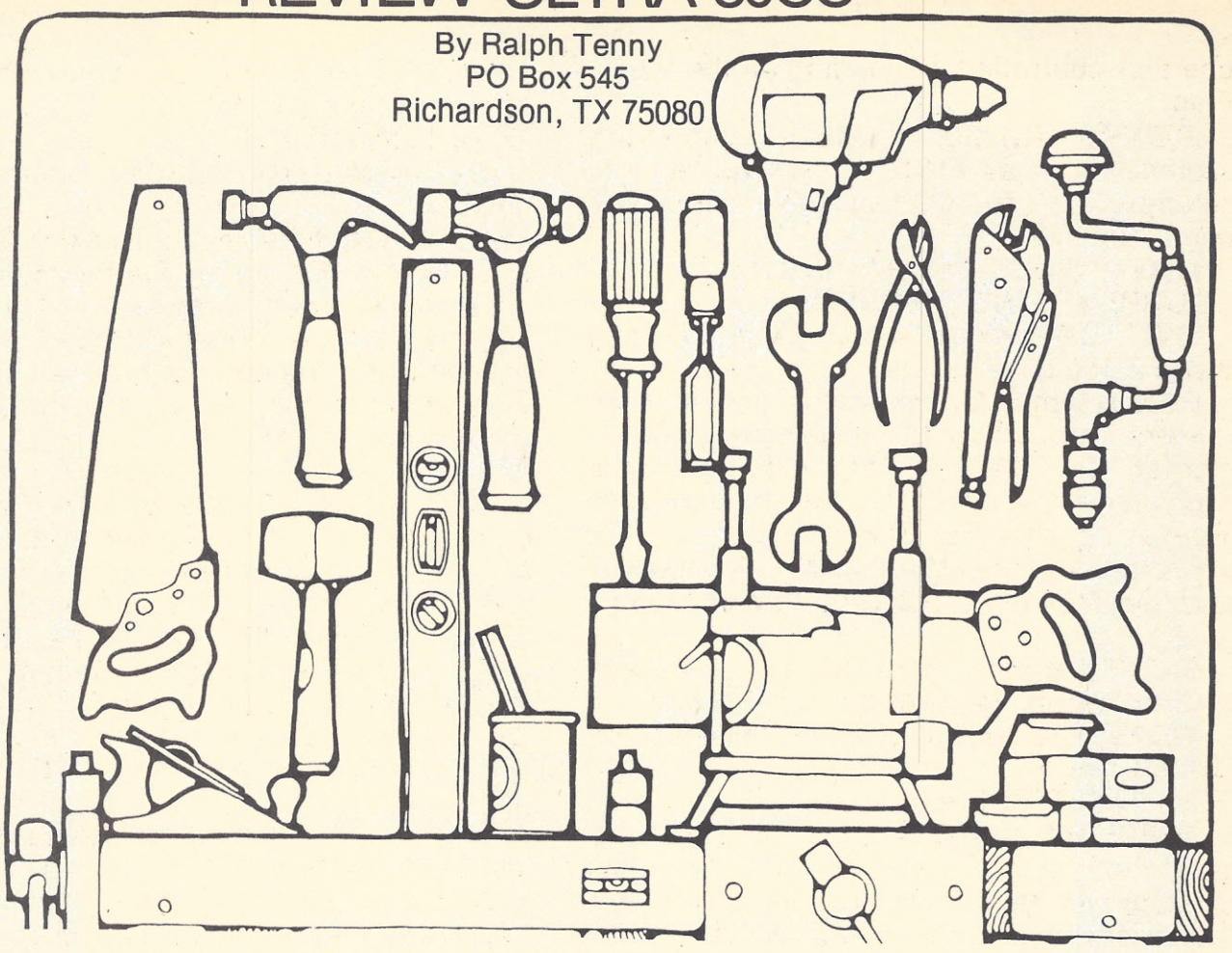
# REVIEW- ULTRA 80CC

By Ralph Tenny
PO Box 545
Richardson, TX 75080



There are many Editor/Assembler packages available for the Color Computer, but one of the best is Ultra 80CC. Ultra 80CC consists of two programs; the TSC Editor and the TSC 6809 Mnemonic Assembler, adapted for the Color Computer. Most 6809 systems which run Flex use these two programs, so they may be familiar to Color Computer users who have precious 6809 experience on larger systems. This adaptation for the Color Computer includes tape read and write from the Editor, and printer output for both modules. This enhancement accomodates the fact that FLEX furnishes I/O routines for all programs compatible with itself. Also, both modules operate from command lines similar to those used by FLEX, so the user who later upgrades to FLEX will already be familiar with this type of operator interface.

The Editor is an exceptionally powerful content-oriented line editor. A line editor uses line numbers (furnished automatically, but not part of the file) to call up text for operator attention. Content-oriented means that phrases or words can be used instead of line numbers to fetch text for editing. The command structure has a full complement of edit, search, copy and delete functions. Complete mastery of the editor's capabilities takes time, but a mini-tutorial shows simple editing examples to get you started quickly.

The commands, called editor directives, are grouped into environment directives, system directives, ''current line'' movers, edit directives and tape directives. In the examples which follow, parentheses are used to enclose optional quantities, '' <> '' are used to indicate required parameters, and ''/'' can be any non-blank printable character.

ENVIRONMENT DIRECTIVES

H(EADER) 'count': a header of 'count' columns will be displayed; tabs (if set) are indicated.

NU(MBERS) (OFF/ON): Set or reset the number flag; line numbers will be printed or not printed.

TAB (columns): control of tab stops.

V(ERIFY) (ON/OFF): Set or clear verify flag; several commands can be automatic or

operator-controlled, depending on the Verify Flag.

Z(ONE) (C1,C2): restrict sub-string searches such as FIND, CHANGE, etc., to columns ''C1'' to ''C2'' inclusive. Default = col. 1 and 132.

LOG or S(TOP): exit the editor.

''CURRENT LINE'' MOVERS

B(OTTOM): move to last line in file and make it the current line.

F(IND)'target'(occurence): move the current line pointer to the line specified by 'target' and make it the current line. If (occurence) is specified by an unsigned integer or asterisk, the directive will be repeated (occurence) times. An asterisk specifies that all occurence of 'target' will be found.

N(EXT)'target'(occurence): The line specified by 'target' is made the current line.

T(OP): The first of the file becomes the current line.

EDIT DIRECTIVES

A(PPEND)/string/(target): Append the specified string just beyond the last character of the current line. (target) defines how many lines (if an integer) or the last line to be appended.

C(CHANGE)/string1/string2/(target) (occurrence): Replace string1 with string2 until (target) is met; (occurrence) specifies the number of occurrences per line to be changed.

CC(HANGE)/string1/string2/(target) (occurrence):like C(HANGE) except that the operator must approve each change.

CO(PY) 'destination-target' 'range -target': The current line plus all lines covered by 'range-target' are moved to follow the line 'destination-target'.

D(ELETE) (target): The current line and all lines until (target) is met are deleted.

I(NSERT): Insert lines beginning after the current line.

M(OVE) 'destination-target' 'range -target': The current line and all lines included by 'range-target' will be moved to follow the lines specified by 'destination -target'.

P(RINT)(target): Print the current line and all lines defined by (target).

R(EPLACE)'target': Delete the current line and all lines defined by 'target' and then replace them with text which follows.

(null): Typing a carriage return will force printing of the current line.

TAPE DIRECTIVES

GAP: Issue a string of 40 null characters to tape.

READ: Read the next file from tape; if test is already in the buffer, the new file will be appended to the existing text.

SAVE (name): Write the entire current file to tape using the specified name.

W(RITE)'target': SAVE the current line through 'target' to tape.

SPECIAL DISK COMMANDS

EDIT'file spec1' (file spec2): Load 'file spec1' from the default drive if it exists; if not, start a new file of that name. If 'file spec1' exists its extension will be changed to .BAK. If 'file spec1.BAK' exists, it will be erased 'with permission'; without permission, action will be terminated. If (file spec2) is used, the existing file will be preserved and the edited file will use (file spec2) as a name.

NEW : Used with disk files larger than available memory. When you are finished editing a section, ''NEW'' will write all the file except the current line to disk and read in more of the disk file being edited.

FLUSH: Same as new except that no new text will be read from disk.

OTHER EDITOR FEATURES

Certain editor characters, such as the prompt character (#) can be redefined by the user. The maximum line number is 9999.99. During an insert operation, for example after line #132, the new lines will be numbered 132.1, 132.2, etc. If an insert is done after #145.1, the first inserted line will be 145.11. The editor will renumber lines as needed, and will renumber all lines in the buffer if the REN(UMBER) command is used.

As you can see, the editor is both powerful and flexible. It requires practice to fully utilize the power available, but this editor is one of the best for assembly-language source code. As stated before, the tape utility will read tape source files from many other editors, and this must be done if the file is to be assembled using the Mnemonic Assembler which comes as part of this package.

THE MNEMONIC ASSEMBLER

This assembler is one of the most powerful available. It supports all 6809, 6801 and 6800

mnemonics, library nesting to nine levels, macros and conditional assembly. Object code is output to disk and the name defaults to the same name as the source. For example, where .ASM is the default extension for output from the Editor, the file TEST.ASM will default to TEST.BIN.

The assembler can handle any size of program if there is sufficient read-write memory to store the symbol table. If the binary file name (default or operator -assigned) already exists on disk, a prompt DELETE OLD BINARY (Y/N)? will appear. A "N" answer will abort the operation, and the old binary file number be renamed to save it. Otherwise, the new binary can be placed in a new file by using this command: ASMB,TEST. ASM,TEST2.BIN. Assembly-time options allow or suppress: binary file, listing, symbol table output, multiple line code expansion, line number, data as part of the heading (the assembler prompts for the date during boot-up), page numbers, printer output and warning messages.

INPUTS AND CONVENTIONS

Numerical constants may be entered in decimal, binary, octal or hexadecimal. ASCII constants may be entered using a single leading quote ('Ξ), and labels must start with a letter and may consist of letters, numbers and hyphens to a maximum of six unique characters. "* " is used in expressions as a symbol for the program counter (* +6). Arithmetic operators are +, =, * , and /. Logical operators are AND (&), OR (!), NOT (!), SHIFT RIGHT(>>) and SHIFT LEFT(<<). Relational operators are =,<,>,<>(not equal), <= (less than or equal) and >= (greater than or equal). Finally, 18 assembler directive or pseudo-ops are supported.

DOCUMENTATION

The documentation is superb, with 38 pages devoted to the Editor and 68 pages explaining the Assembler and giving details and examples of how to handle assembler directives and 6809 assembly language. Although much space is devoted to 6809 particulars, it is noted that their intent is to explain the assembler rather than teach assembly language programming. Finally, three addenda explain various aspects of the Color Computer adaptation and document a separate utility: JOIN. This utility concatenates two binary files, creating a new, merged file from two separate binary files, and allows each input file to have multiple origins. As a result, precision overlays can be produced, effectively modifying a file (for example, updating a printer driver routine) without a complete new edit/assembly pass.

This package is an outstanding bargain for the serious assembly language programmer, and can be very helpful to novice programmers in helping to formulate good assembly practice. ULTRA 80CC is available from Spectral Associates, 141 Harvard Ave., Tacoma WA 98466 for $49.95 plus postage and handling.

You can use Radio Shack's "Color File" ROM pac to print mailing labels. Use one-up labels 15/16 inch high. Define 5 fields but use only four. Make sure to designate the last line as alphabetic or a zero will enter automatically. Of course the fifth line could be used as a sorting code.

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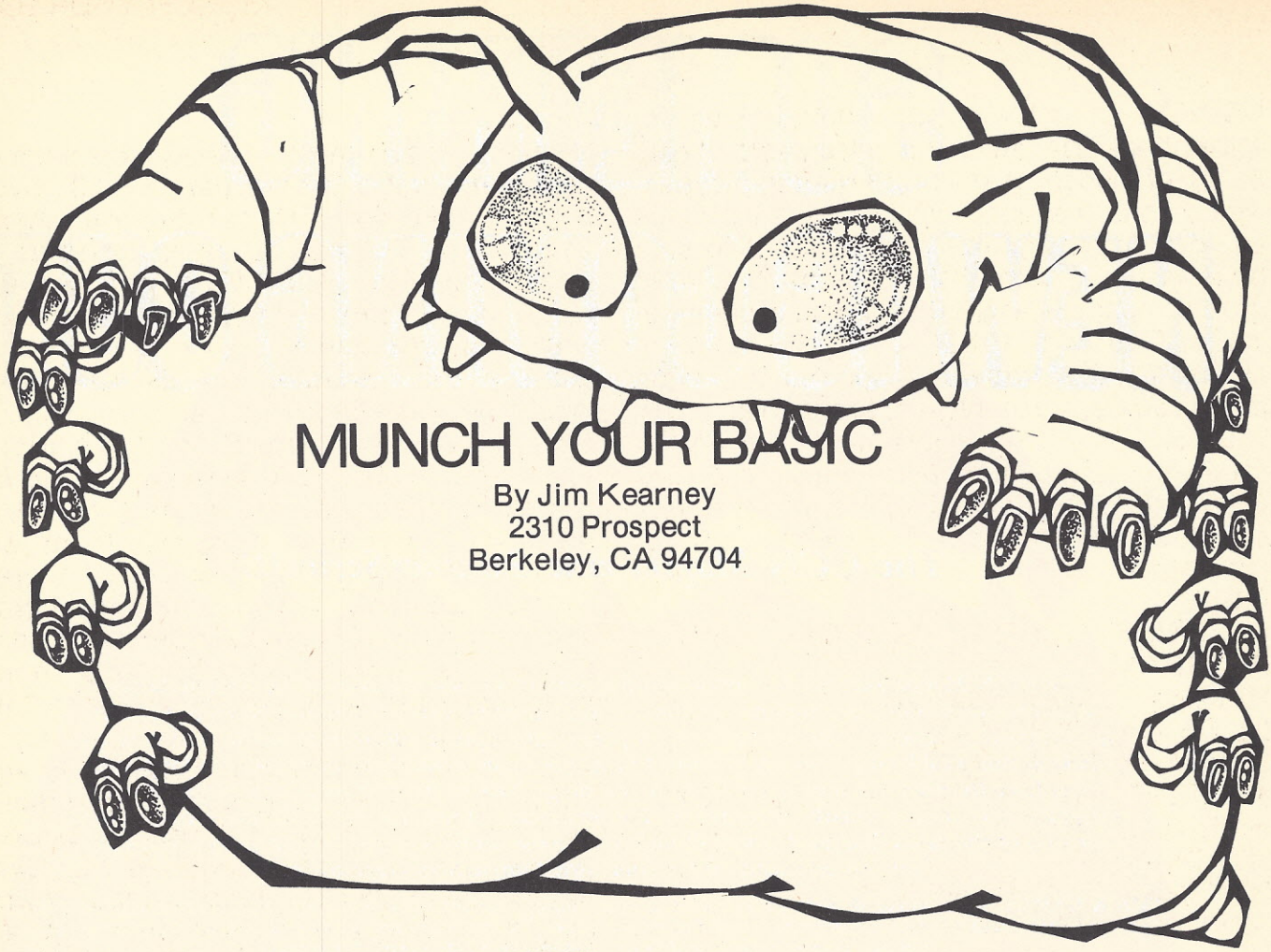

# MUNCH YOUR BASIC

By Jim Kearney
2310 Prospect
Berkeley, CA 94704

If you have ever taken a class in BASIC programming, or read a book on BASIC programming style, you probably have seen these guidlines for writing programs:

::One statement per line.

::Well commented, including large descriptive blocks of comments at the beginning of subroutines.

::Use spaces to show the control flow and to clairify statements; for example you should write

```
FOR X = 1 TO 54 + I STEP B + 1
```

instead of

```
FORX = 1TO54 + ISTEPB +
```

This is all well and fine; these rules make perfect sense if you want to write well documented, easily maintainable programs. Now comes the interesting part. If you look through your Radio Shack books long enough and hard enough (not very organized, are they?) you can find some official hints on how to speed up and trim down your program. Among them are:

::Put as many statements as possible on a line.

::Remove REMs and 's from your program.

::Remove all unnecessary spaces from your program.

Very interesting! Good programming pratices make the program larger and slower!

## So What Can You Do?

Well, you could go through your BASIC program and carefully remove all the REMs, and all the spaces and combine lines together..if you have a couple of hours each time you change your program. You could write your programs in the ''short'' style to begin with, but coming back three months later and fixing some bug you just found will not be easy. Now we come to the purpose of this article: What If you had a program that would take a program written in the ''long'', nice style and do all the messy work of removing extra stuff, combining lines and so on automatically? Well, here it is.

## The MUNCH Program

Presented in Listing 1 is just such a program. It loads in the tape buffer (at $01DA) normally, but if you are using the tape to load programs (including the

MUNCH program), you should load it somewhere else. Since it is relocatable, it can be offset loaded. A good alternative location would be in the graphics area (just don't run any graphics programs and expect it to still be there). In non-disk systems the first graphics page is at $0600, in disk systems it is at $0E00 (with FILES 2). If you have an assembler, it's probably a good idea to type in the source, since it is less prone to error. If you don't you'll have to type in the object code with some kind of monitor, such as CBUG. If you don't even have a monitor, you can enter it with this simple Extended BASIC program:

```
4 CLS
6 PRINT ''HEX OBJECT ENTRY PROGRAM''
10 INPUT ''ADDRESS'';A$
20 A=VAL(''&H''+A$)
30 IF A=0 THEN END
40 PRINT ''($'';HEX$(A);'' = $'';HEX$(PEEK(A));''): '';
50 INPUT H$
60 IF H$='''' THEN 10
70 POKE A,VAL(''&H''+H$)
80 A=A+
90 GOTO 40
```

Then use (C)SAVEM ''MUNCH'', ??,??,?? (where the ?'s are the start, end and execution addresses) to save it on tape or disk.

## How To Use It

Once you have debugged and tested your ''nice'' BASIC program, you can use MUNCH on it. First save the ''nice'' program (or load it if its an old program), then make sure MUNCH is in memory. If you haven't loaded it since you turned the power on, or run another machine language program, or have used graphics and destroyed the memory MUCH is in, you must (C)LOADM ''MUNCH''. When you have the BASIC program (try LISTing it) and MUNCH both in, simply type EXEC. There will be a slight pause and the computer will reply OK. If you now LIST your program, you will see it has been transformed! You should now save it (under a different name than the original). Always keep the original BASIC program; that way you can make changes to it and simply MUNCH it again.

## Caveats

There are two things MUNCH does not do (what do you want from a 250 bytes program? the world?) which the user should be aware of. The first concerns variables. In Color Computer BASIC, using a variable name like 'SALES' is allowed, but only the first two characters ('SA') are used to identify the variable, so 'SAXOPHONE' would be considered the same variable. A corollary of this 'feature' is that variable names longer than 'SA' waste space storing the extra characters and waste time, since the BASIC interpreter must skip them as it runs the program. They also can be a great source of confusion if you write the program expecting 'SALES' and 'SAXOPHONE' to be different variables. So, a good rule of thumb is to only use 1 or 2 characters for the variable name.

The other thing to watch out for is very long lines. MUNCH, in its quest to combine as many lines together as possible, is quite capable of making very long lines. However, the EDIT and LIST commands will only work on lines that are a maximum of 254 characters long. Consequently, you will not always be able to modify a MUNCHed program. This should not be a problem, since modifications should aways be made to the original, unMUNCHed program.

## One Last Hint

When BASIC encounters a number in your program, such as in the statement:

A = B+100,

it must convert the human-type text representation into a computer-type binary representation before it can use it (in this case add it to B). This takes thousands of machine cycles to do. If such a statement was used often, for example in a FOR-NEXT loop, you are making the machine waste YOUR valuable time. You can do something, however. It takes much less time for BASIC to find and load a variable than it does to read a number; so you could set a variable to the number (like C1 = 100) and use that variable instead of the number. Of course, in a program with many constants you'll have to choose which are most worthy of this treatment. A simple example:

```
10 FOR I = 1 TO 1000
20 A = I+3.1415926
30 NEXT
```

...takes 7.7 seconds to run
Making a slight change....

```
5 PI = 3.1415926
10 FOR I = 1 TO 1000
20 A = I+PI
30 NEXT
```

only takes 5.1 seconds to run! This is a big improvement for such a simple change.

So now you have all kinds of tools and toys to speed up and trim down your BASIC while improving style!

LISTING 1.

```
; MUNCH: a program to make
;  BASIC programs as efficient
;  as possible. The program
;  does 4 things:

;    1] removes REM statements
;    2] removes extra spaces
;    3] compacts lines together
;       when possible
;    4] removes extraneous '"'s
;       and ':'s
;
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;      2310 Prospect
;      Berkeley, Ca. 94704

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;    is given freely; otherwise contact
;    the author.

; The program is relocatable,
; although designed to be
; loaded into the cassette
; buffer normally.

0001                    ORG $1DA

                ; BASIC variables referenced:

0002 0019  START   EQU $19
0003 001B  ENDPRG  EQU $1B
0004 002B  TEMP    EQU $2B
0005 008A  ZERO    EQU $8A
0006 00A6  PTR     EQU $A6
0007 009F  NEXT    EQU $9F

                ; BASIC subroutines called:
0008 AF67  GETNUM  EQU $AF67 get a line #
0009 ACEF  RELINK  EQU $ACEF fix line links
0010 AD26  CLEAR   EQU $AD26 do a CLEAR
```

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# Move up to C language

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```
; MUNCH goes though 2 major
; phases:

; PHASE 1::

; first we scan the text and
; do 2 things:
;
;  [1] mark lines that are referenced
;      by GOTOs, GOSUBs, THENs and ELSEs
;  [2] mark lines containing ELSEs,
;      THENs and GOTOs
;
; This marking is done by setting

                        ; the link field of each line negative

                        ; register usage:
                        ;  X = pointer to BASIC source
                        ;  U = mark this line flag

0011 01DA 9E19          MUNCH  LDX START
0012 01DC DE8A                 LDU ZERO
0013 01DE EC84          NL     LDD ,X
0014 01E0 10270059             LBEQ DOIT
                        ; should this line be marked?
0015 01E4 EF7E                 STU -2,S
0016 01E6 2704                 BEQ NOMARK
                        ; yes, mark it
0017 01E8 86FF                 LDA #$FF
0018 01EA A784                 STA ,X
0019 01EC CEFFFF        NOMARK LDU #-1
0020 01EF 3004                 LEAX 4,X
                        ; scan the line for GOTOs, GOSUBs,
                        ;  THENs, RETURNs and ELSEs
0021 01F1 3341          MARK   LEAU 1,U
0022 01F3 9FA6          INXT   STX PTR
0023 01F5 A680                 LDA ,X+
0024 01F7 27E5                 BEQ NL
0025 01F9 8190                 CMPA #$90       (RETURN TOKEN)
0026 01FB 27F4                 BEQ MARK
0027 01FD 81A7                 CMPA #$A7       (THEN TOKEN)
0028 01FF 2710                 BEQ GN1
0029 0201 8184                 CMPA #$84       (ELSE TOKEN)
0030 0203 270C                 BEQ GN1
0031 0205 8181                 CMPA #$81       (GO TOKEN)
0032 0207 26EA                 BNE INXT
0033 0209 9D9F                 JSR NEXT
0034 020B 81A6                 CMPA #$A6       (SUB TOKEN)
0035 020D 2602                 BNE GN1
                        ; mark the current line
0036 020F 335F                 LEAU -1,U
                        ; Cross reference the line
0037 0211 9D9F          GN1    JSR NEXT
0038 0213 2406                 BCC CONT
0039 0215 8D08                 BSR XREF
                        ; is this part of a ON GOTO/SUB?
```

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## FLEX COMES TO THE COLOR COMPUTER

by Dale L. Puckett

Owners of the Radio Shack Color Computer--which already sports a 6809E microprocessor--are now able to run the FLEX (a trademark of Technical Systems Consultants, Inc.) operating system. Frank Hogg Laboratory, Inc. of Syracuse, New York is selling it now. His version runs on the standard Radio Shack disk controller so Color Computer owners may have the best of both worlds--fantastic color graphics from Microsoft's Extended Color Basic and access to the growing library of sophisticated systems and applications software running under FLEX.

### WHY DO I NEED FLEX ON MY COLOR COMPUTER

In an attempt to answer that question, this article will look at FLEX in great detail. But, first we'll get to the bottom line. FLEX has become the standard operating system for the 6809 and other 68XX microprocessors since its release nearly five years ago. Because it is a standard, nearly every piece of software available for the 6809 is supplied on a FLEX formatted disk.

### IT'S ONLY THE BEGINNING

Because of a current 6809 explosion on the hardware scene, the already comprehensive FLEX-based software library will be expanding rapidly in the near future. This hardware boom will even see Apple users running 6809 FLEX software. In fact, ESD Labs Co., LTD of Mission Hills, California is selling an Apple plug-in board called Excel-9 which comes complete with FLEX and the TSC Editor and Assembler. The Mill, from another California firm, is using a 6809 running the OS-9 operating system and I'm predicting that you will soon see it sporting FLEX.

FLEXI, a 6809-based single board micro from The Computerist in Chelmsford, Mass., will be running FLEX as will FOCUS, a stand-alone 6809 system from the same firm.

FOCUS comes with a high quality keyboard, memory-mapped video featuring bit-mapped graphics and user definable characters and dual double-sided, double density disks which give you nearly 650 thousand bytes of storage on line.

All of this new 6809 hardware, added to the several hundred thousand Color Computers hitting homes across the nation means one thing--there is going to be a tremendous demand for FLEX-based software.

### SOFTWARE — THE BOTTOM LINE

Frank Hogg first recognized the need for high quality FLEX-based software in 1979. In the three years since he has become the leading international distributor of systems and applications software for the 6809.

A quick look at one of Hoggs recent ads gives Color Computer users an idea of the powerful software that will be instantly available to them when they boot up FLEX. Hogg handles software from the major 6809 houses--TSC and Microware--and several dozen independent authors.

Application programs include: Data base management systems, Mailing lists, sales reports and invoice creation; SPELLTEST, the most versatile Spelling Checker available on the 6809; READTEST, a program that tests and reports the readability of English prose; DynaStar, a cursor-based editor that is extremely easy to use; The Bill Payer System, a series of 28 programs that automate the drudgery of paying the bills; and XFORTH, a interpreter that is totally FLEX compatible and supports an entire family of applications software.

Hogg also supplies the popular Osborne "Some Common Basic Programs" package; Super Sleuth, a disassembler that analyzes 6800, 6801, 6809, 6502, 8080 and Z-80 code; DynaCalc, a Visicalc-like spreadsheet; and ESTHER an educational and fun experiment with artificial intelligence coded in 6809 assembly language. It is based on the famous MIT ELIZA program.

### FLEX — A FAMILY HISTORY

TSC first released FLEX back in 1977 with mini-FLEX, a 4K operating system that resided from $7000 to $7FFF on SWTPC's 6800 system. Soon, that 4K system gave way to FLEX 2.0, an 8K system which lived in high memory between $A000 and $BFFF. When this version came out, the 68XX family fell in love.

We had something going for us that no one else had--a disk operating system that would run on everyone's 68XX machine. It didn't matter what brand you owned. As a bonus FLEX was versatile, reliable and easy to use from a high level language like BASIC or from our own assembly code.

### FLEX — THE COMMAND SET

FLEX brings a powerful set of commands to the Color Computer. You will be able to control all disk operations directly from your keyboard. It will also put a smorgasbord of disk access and file management routines at your fingertips.

In fact, the Utility Command Set will probably be the most important part of the FLEX system for the average Color Computer owner. More than two dozen commands reside on a system disk and are loaded into memory when needed. They let you do things like save, load, copy, rename, delete, append or list disk files. Simple English words actually become commands to your disk drives. A

FLEX: A list of some of the files included with FHL Color FLEX.

| | |
|---|---|
| ERRORS | File of ERROR messages. |
| HELP | Online HELP system. |
| COPY | File copy utility. |
| NEWDISK | Disk formating utility. |
| CAT | CATalog utility. |
| SDC | Single Drive Copy utility. |
| LIST | Command for listing a text file. |
| ASN | Utility for assigning both system and work drives. |
| DELETE | Delete file utility. |
| RENAME | Rename file utility. |
| SETUP | Set system parameters, disk, terminal etc.. |
| TTYSET | Set terminal parameters, backspace,page depth etc. |
| SAVE | Machine language save utility. |
| APPEND | Append several files together. |
| BUILD | Create a text file. |
| EXEC | Execute a text file as a command list. |
| JUMP | Jump to a memory location. |
| MOVEROM | Move RS basic to RAM. |
| BASIC | Execute RS Basic with 39K. |
| DATE | Display and/or change system date. |
| O | Redirect output to disk file. |
| VERSION | Display file version number. |
| PROT | Set or clear file protection status. |
| VERIFY | Display or set verify flag. |
| I | Redirect Input from disk file. |
| XOUT | Delete all files with an .OUT extension. |
| LINK | Link the boot program to FLEX. |
| CBASIC | Execute Extended RS Basic. |
| PUTBOOT | Install boot on disk. |
| X5124BW | Hi-Res screen 51 X 24 black on white. |
| X5124WB | Hi-Res screen 51 X 24 white on black. |
| X6424BW | Hi-Res screen 64 X 24 black on white. |
| X6424WB | Hi-Res screen 64 X 24 white on black. |
| X6432BW | Hi-Res screen 64 X 32 black on white |
| X3216BW | Hi-Res screen 32 X 16 black on white. |
| EXT | External terminal program. |
| INT | Return to internal terminal. |
| MEMPATCH | Patches for TSC diagnostics |
| MEMPATCH | Patches for TSC diagnostics |
| DIAPATC1 | Patches for TSC diagnostics |
| DIAPATOO | Patches for TSC diagnostics |
| DIAPATOO | Patches for TSC diagnostics |
| DIAPATC1 | Patches for TSC diagnostics |

When the DBASIC option is selected.

| | |
|---|---|
| DBASIC | RS Disk Basic for FLEX disks. |
| RTF | Radio Shack to FLEX copy utility. |

There are two major parts to the FLEX system--the File Management System (FMS) and the Disk Operating System (DOS). Together they give you fully dynamic file space allocation, automatic removal of bad sectors on a disk, automatic space compression and the ability to match the system to your Color Computer.

### HARDWARE REQUIREMENTS

FLEX requires 8K of high memory and a minimum of 12K of low memory. The 6809 version runs at $C000 to $DFFF. On the Color Computer you can gain access to this memory by making the simple modification printed in an earlier Color Computer News. (32K for FREE, Feb 1982 CCN)

A minimum of two disk drives is assumed by most FLEX utilities. However, Hogg is supplying a Single Disk Copy routine written by this author that lets Color Computer users get started with one drive.

FLEX is booted into memory by a single-letter command in the monitor on most systems. Hogg ships FLEX on a disk that will boot directly from the Radio Shack disk system. About two seconds after you boot FLEX a banner is printed and you are asked for a date. As soon as you enter the date, you will see the famous FLEX prompt, "+++". The three plus signs mean that the operating system is waiting for your command. You literally have the world at your fingertips.

### FLEX: HOW IT WORKS

Your files are stored in sectors on the disk. Each sector holds 256 bytes of information. Four of these are used to tell FLEX where to read or write its next sector. The remaining 252 hold your data. When you delete a file, the sectors you had been using are automatically released to the system and become available for use by new files. This is known as dynamic allocation.

Color Computer FLEX files have names containing up to eight alphanumeric characters plus a three character extension. The extension tells you and the system what type of information is in the file. APPEND.CMD, for example, is a command which lets you append two files into a third file.

Color Computer users may also tell FLEX which drive they want to search for a file. However, most of us use FLEX's default system and work drives. This convention really makes life easy. Plus, there is a utility command that lets us change drive assignments at any time.

For example, "ASN S=0, W=1" will assign drive zero as the system drive and drive one as the work drive. Then, if we type, "LIST THISFILE"--FLEX will go to drive zero and read in the command file LIST. It will then go to drive one and list THISFILE.TXT to the terminal.

### FLEX: REDIRECTION

If you would like to list THISFILE on your printer instead of on your Color Computer screen, simply type: P LIST THISFILE. If you want to build a disk file that contains a catalog of all your command files on the disk in your work drive, type: O CATALOG CAT. This will open up the output file CATALOG.OUT and direct the output of

continued on page 4.

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CAT to this file instead of the Color Computer screen. Later you can LIST the output file.

Any errors you make are reported to you in English on your Color Computer. FLEX does this by maintaining a random file of error messages on your system disk. If the file management system or DOS generates an error, the system reads the error number and finds the corresponding record on the file and lists it to your screen.

**FLEX: THE MEMORY MAP**

FLEX is a great operating system because it is completely documented. For example, the programmers manual lists every memory location containing any information of interest. Color Computer users can check a handy chart and know just where to PEEK to find out which character FLEX is using for a backspace or how many columns they have on their screen, etc.

TSC has completely documented 22 routines which may be called by Color Computer programmers. They are vectored from a jump table so they are always at the same location, even though the particular version of FLEX owned by the user may vary.

This means that you can write a program on your Color Computer and sell it to someone running a GIMIX or other SS-50 buss 6809 system and he will be able to run it immediately, with no modification. Think of all the money you can make.

Here's an example from SPELLTEST, my spelling checker program for FLEX systems. I often need to find out if a character is alphanumeic or not. With FLEX it is easy.

```
JSR FMS      go get a character
JSR CLASS    alphanumeric?
BCS NONAL    it's not, go
(continue process)
```

I get a character by calling FMS. I check it by calling a FLEX DOS routine, CLASS. In two lines of code I have done what would have taken 20 or 30 lines if I had needed to write my own CLASS routine.

Another example comes from READTEST, my readability tester.

```
LEAX NUMPW,PCR    point to word count
LDB #1            use spaces
JSR OUTDEC        print the number
LEAX NUMMSG,PCR   point to message
JSR PSTRNG        let FLEX print it
(continue process)
```

To tell the user how many personal words he has used in his text, I simply point the 6809's X-register to the location of the two-byte (16-bit) word, set the B-register not equal to zero, and call FLEX's OUTDEC to print it.

I then point the X-register to an English language message and call another FLEX routine to print it. Without FLEX, I would have had to write one routine to output a decimal number and another to output a string of characters. This would have taken a lot more code and a lot of time.

**FLEX: THE FILE MANAGEMENT SYSTEM**

FMS lets you talk to your disk hardware. It allocates all file space and takes care of all the record keeping for you. You talk to FMS through a file control block (FCB).

These 320-byte blocks tell FMS the name of a file, the drive it is located on, etc. To talk to a disk file you simply read or write one character at a time to the FCB. Instead of calling an output routine in your Color Computer BASIC ROM, you call FMS. For example, the code below sends the letter "A" to a disk file.

```
LDA #'A          put character in A-reg.
LEAX FCB,PCR     point X-register to FCB
JSR FMS          Send it out to disk
BNE ERROR        go on error


(continue process)
```

When used in this way, your Radio Shack Disk system disk looks no different to your program than your Color Computer screen. You may even have one file open for reading and another open for writing. In fact, you may have as many files as you need open at one time, as long as you have enough memory to assign a separate file control block to each one.

Color Computer programmers, can talk to FLEX's File Management System by using function codes. For example, "1" means open a file for read. To do this you simply store "1" in the first byte of the FCB, point the X-register to the FCB and call FMS. If the operation is successful FMS will return with the carry bit clear. If not, the carry bit will be set and the number code of the error will be found in the second byte of the FCB. You can then read (PEEK) that byte and see if it is something you expected--like perhaps the end of a file. After reading this byte you can take the appropriate action with your program.

**SUMMARY**

FLEX supports random files and can reach any sector in a file after no more than two disk reads. It is very easy to read a specific character in a file by doing a small calculation with the number of bytes in a sector. Color Computer FLEX has many other features that make it a dream to program at the assembly level.

But, here's the most important thing to the Color Computer user just buying a disk system--FLEX is user friendly and its syntax is simple. In fact, if you compare the FLEX manual with the CP/M manual, you'll find that FLEX is much easier to use at the command level, let alone at the assembly language programming level.

When you consider this and add the fact that a large base of extremely sophisticated applications software as well as almost every computer language written for a microcomputer runs under the FLEX system, it is easy to see why there is a 6809-based hardware boom. All of this software is going to make your Color Computer worth a whole lot more than you ever dreamed.

□

# OPERATING SYSTEMS

**FHL Color FLEX**

The FLEX Operating System for the Radio Shack Color Computer. Requires 64K, Extended Basic and drive 0. See ad on page 2.

FHL Color FLEX **$99.00**

**TSC FLEX (tm) Operating System**

FLEX has become the standard disk operating system of 6800 and 6809 users. A single user system, it was designed to be very powerful, yet very easy to learn and comfortable to use. Some of FLEX's features are dynamic filespace allocation, random and sequential file accessing, batch job type program entry, user startup facility, automatic drive searching, file dating, space compression, complete user environment control, English error messages, and over 20 commands for all normal disk operations. 8K of RAM is required at $A000 for 6800 or $C000 for 6809 and a minimum of 12K of user memory must be in low memory. Price includes user's manual, advanced programmer's guide, editor, assembler, and object code diskette. FLEX is not relocatable or reentrant. These systems are supplied on 8 or 5 1/4 inch soft-sectored floppy disks.

For SWTPC: These versions of FLEX are for Southwest Technical Products' 8 inch DMA disk system or their 5 1/4 inch minifloppy system.

6800 FLEX for SWTP **$150.00**
6809 FLEX for SWTP **$150.00**

For SSB: These versions of FLEX are Smoke Signal Broadcasting's 8 and 5 1/4 inch disk systems.

6800 FLEX for SSB **$150.00**

For EXORcisor (tm): These versions of FLEX are for Motorola's EXORcisor (tm) using EXORdisk (tm) II or III. No hardware modifications are necessary; the user simply boots from a FLEX disk instead of an MDOS (tm) disk. 8 inch disk only. (EXORcisor, EXORdisk, & MDOS are trademarks of Motorola, Inc.)

6800 FLEX for EXORcisor **$150.00**
6809 FLEX for EXORcisor **$150.00**

For General Use: These versions of FLEX are for general use in that they are prepared and documented so that a user can customize them for most any hardware system. The user writes terminal I/O driver routines and disk I/O driver routines for his hardware and appends them onto the body of FLEX. Through the driver routines, FLEX can be adapted to almost any random access mass storage device from minifloppys to Winchester technology disks. However, since these versions of FLEX are supplied on soft-sectored floppy disks, the system must have at least one soft-sectored 8 or 5 1/4 inch floppy disk drive in order to initially bring FLEX up. Note also that all FLEX support software from Technical Systems Consultants is supplied on soft-sectored floppies. This package is not for beginners. It assumes the user is capable in assembly programming and in the disk controller interface hardware. Technical Systems Consultants will not assist in adapting this FLEX and disclaims all responsibility for the adapting and functioning of this software on custom hardware.

General 6800 FLEX **$150.00**
General 6809 FLEX **$150.00**

**MICROWARE OS-9 LEVEL ONE OPERATING SYSTEM**

OS-9 is the industry standard 6809 operating system. It is a Unix-like multitasking, real-time operating system for use on systems having up to 56K memory. Its modular structure makes OS-9 easily adaptable to almost any 6809 computer system. OS-9 is widely used for applications in data processing, industrial automation, communications, instrumentation, and education. OS-9 features:

* Real-time multitasking executive in ROM
* Full timesharing support for 2 to 4 users
* Tree-structured multilevel disk file directories
* Byte-addressable random-access files
* Device independent, interrupt-driven input/output
* Modular software memory management
* Powerful command interpreter with I/O redirection
* Over 40 utility command programs
* Supports any combination of I/O devices including floppy, Winchester and other hard disks; terminals, printers, etc.
* Off-the-shelf versions available for most popular 6809 computer systems

**$200.00**

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# LANGUAGES

**DBASIC (For Color Flex)**

DBASIC is RS DISK BASIC for the Frank Hogg implementation of FLEX. It will not work with other versions of FLEX. The program allows for disk input and output operations which are done through FLEX and are compatible with FLEX Utilities, meaning that files and programs written to disk by DBASIC may be manipulated by FLEX editors, sort/merge, etc.

Comment: If you want to have graphics capability or just to use many of your existing RS programs, but you want to have the convenience of the FLEX system, then DBASIC is for you. It does everything that RS BASIC does with the exception of Random Files (direct access). It does not use the Hi-Res screens that are common to FHL FLEX because of memory and other conflicts. 80% of the people that buy our FLEX elect to get DBASIC.

For FHL Color FLEX.

| | |
|---|---|
| With FLEX | $30.00 |
| Object only | $40.00 |

**TSC BASIC for 6800 & 6809 for FLEX**

Currently the fastest floating point Basic interpreter available for any 8 bit micro, this version supports all of the standard BASIC statements and functions as well as many extended capabilities. Both floating point and string variables are provided with strings being fully dynamic and unrestricted in size. Other features include single and double dimensioned arrays, and "IF..THEN..ELSE" construct. HEX function, and the constant PI. Array size, loop nesting, subroutine nesting and string length are only limited by the amount of user memory available. The floating point arithmetic done by BASIC is performed to seven digits accuracy internally, with all answers printed to six. The dynamic range of the numbers is 10 raised to the plus or minus 37th power. The disk versions support ON ERROR GOTO statements for complete user program control. A COMPILE command allows BASIC to save programs to disk in a concise, non-source recoverable form which permits proprietary software distribution. The standard SAVE and LOAD commands work with standard FLEX text files. Program TRACE and a RENUMBER facility have also been added to the disk BASIC. The disk versions support I/O in the form of sequential files and two random access file structures, Record I/O and Virtual Arrays. The cassette versions are easily adapted to run in any 6800 or 6809 system having at least 12K of user RAM available from location 0000. A system with 16K or more of memory is recommended for serious applications and for the disk versions.

| | |
|---|---|
| 6800 BASIC w/cassette | $75.00 |
| 6800 BASIC w/disk | $75.00 |
| 6809 BASIC w/cassette | $75.00 |
| 6809 BASIC w/disk | $75.00 |

**TSC EXTENDED BASIC FOR 6800 & 6809 for FLEX**

This BASIC is ideal for business or advanced scientific applications where extended math precision and formatting capabilities are essential. All of the features of our regular BASIC are supported plus much more. The floating point math package provides 16.8 digits of precision. Most of the math functions are accurate to 16 digits with a minimum of accuracy of 13.5 digits. Integer variables are also allowed for speed in control loops and array indexing. PRINT USING has been included in this BASIC and supports string formatting, number fields, dollar and asterisk fill, trailing minus sign, imbedded commas, and scientific notation. A DIGITS statement allows the user to set the maximum number of digits printed in a number as well as the maximum number of fractional digits. New string functions have been added for string searching (INSTR) and for creating a string which is the date (DATE$). DPEEK and DPOKE are 16 bit peek and poke type functions which make address manipulations in BASIC a breeze. The INCH$ function allows single character input from the terminal. Programmer control of CTRL C has also been added. Extended BASIC is 19K in length with 32K of user memory recommended for operation.

| | |
|---|---|
| 6800 Extended BASIC | $100.00 |
| 6809 Extended BASIC | $100.00 |

**TSC PASCAL for 6809 for FLEX**

This Pascal is a true native code compiler which produces assembly language mnemonics. The specification for the syntax and semantics is based on the Jensen and Wirth User Manual. Both integer and double precision floating point math are supported with the standard trigonometric, exponential and square root functions and a random number generator. Records, arrays, sets, pointers, dynamic storage, file I/O with GET and PUT, and calling another Pascal program from a Pascal program are all implemented. UniFLEX supports both random and sequential file access. FLEX supports only sequential file access. The user may pass parameters, such as file names and options, from the command line to the user's Pascal program. Note that both the operating system and run-time library must be resident to execute a user's program. The FLEX version of Pascal requires a 56K system in order to function, and the minifloppy version requires two diskettes.

| | |
|---|---|
| 6809 FLEX Pascal | $200.00 |

**A/BASIC COMPILER (Basic Compiler for OS-9 and FLEX)**

This BASIC compiler generates pure, fast efficient 6809 machine code for easy to write BASIC source programs.* Uses ultra-fast integer math, extended string functions, boolean operators and run-time operations. Output is ROMmable and RUNS WITHOUT ANY RUN-TIME PACKAGE. Supports IF-THEN-ELSE structure, random access and several improvements over the original 6800 version sold by Microware. Optimized for the 6809, A/BASIC is 8 to 10 times faster than the original 6800 version and produces code approximately 30% smaller. Supports the following statements:

REM, END, CALL, FOR/NEXT, GOSUB/RETURN, IF/THEN, ON ERROR GOTO, ON-GOTO/ON-GOSUB, STOP, GEN, STACK, INPUT, PRINT, CLOSE FILES, OPEN, CLOSE, WRITE, RWRITE, READ, RREAD, CHAIN, RESTORE, SCRATCH, KILL.

Includes Chess in A/BASIC source.

Comment: A/BASIC does not compile RS Basic or any other Basic. It is an integer only (no floating point), version of BASIC. It can be used for games and graphics, but it has no built in functions for them. A/BASIC is a powerful addition to your library, and it does not require a license to use or sell the compiled code produced from it. FH

Written for 6809 OS-9 or FLEX

| | |
|---|---|
| Object only | $150.00 |

* Source programs on disk.

**DYNASOFT PASCAL**

Dynasoft Pascal is a portable p-code implementation of a Pascal subset specifically tailored for small scale microcomputer systems. It was written because we realized that not every microcomputer is built in the image of its big brothers: not every microcomputer has 48K of memory or dual floppy disks: not every microcomputer application requires floating point arithmetic; and not every system needs a full scale version of the Pascal language.

Dynasoft Pascal is PASCAL SUBSET which includes the control structures of standard Pascal and supports the data types INTEGER, CHAR, BOOLEAN, scalar (enumerated), subrange, pointer, and ARRAY, along with the dynamic memory management functions NEW, MARK, and RELEASE. Its design is such that it is virtually impossible to write "spaghetti code", and the result is programs that are highly structured and highly readable.

Dynasoft Pascal is COMPLETE. It includes a fast one-pass compiler, a p-code interpreter, a supervisor program, and program SAVE, and LOAD routines that can be adapted for media ranging from paper tape to cassette to floppy disks. For speed-sensitive applications there is a built-in interface to machine language routines complete with parameter passing.

Dynasoft Pascal is COMPACT. The entire system will run on systems with as little as 12K of available RAM without overlaying. The p-code interpreter is so compact that it is possible to build a target system in which both the interpreter and a simple p-code program can share a single 2K ROM. This makes it suitable for programming a tremendous range of applications, from simple dedicated controllers to sophisticated text editing systems, assemblers and compilers. It produces ROMable p-code which is also compact: a typical algorithm compiles to less than half the size of the same algorithm expressed in the native code of an 8-bit processor. This means that you can get a lot of program in a surprisingly small amount of memory. The tradeoff of course is speed, but it is still alot faster than most BASICs, and if you think about it, in alot of applications the processor spends most of its time waiting for something to happen anyway.

Dynasoft Pascal is PORTABLE. It is currently available for systems based on the 6809 microprocessors and more are planned. Programs written in Dynasoft Pascal are compatible at both the source and p-code levels: they can be transferred to a new machine without even re-compiling.

Written for FLEX and OS-9

| | | |
|---|---|---|
| OS-9 | Object only | $69.95 |
| | w/run-time source | $99.95 |
| FLEX | Object only | $59.95 |
| | w/run-time source | $89.95 |

**TSC BASIC Precompiler for 6800 & 6809 For FLEX**

This package allows the user to write BASIC programs in a non-standard BASIC source format. This non-standard format includes unlimited length variable names and alphanumeric line labels instead of line numbers. As an example, subroutines may be given a name and called by that name instead of a line number. Line numbers are not required at all and comment lines may be inserted anywhere. All these features produce a very readable, well-documented, and easy - to-correct and maintain BASIC program. The output of the precompiler is in the BASIC compiled form, allowing application programs to be written, precompiled, and then distributed in a non-source form. This precompiler can only be used with Technical Systems Consultants' BASICs. The standard BASIC Precompiler must be used with standard BASIC and Extended BASIC Precompiler must be used with Extended BASIC.

| | |
|---|---|
| 6800 Standard Precompiler | $50.00 |
| 6809 Standard Precompiler | $50.00 |
| 6800 Extended Precompiler | $50.00 |
| 6809 Extended Precompiler | $50.00 |

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**FORTH**

FORTH is a total programming environment which allows the user to edit, assemble, compile, or interpret source code without having to enter different modes to perform these different tasks. The full power of FORTH is available to the user at all times. FORTH compiles very compact code which executes very fast.

FORTH is fully extensible: writing programs in FORTH is equivalent to extending the FORTH programming language and environment.

A programming project in FORTH is designed in top-down fashion, then coded by first writing the lowest level words required (if not already available in FORTH), then words at a higher level are written using the previously defined words. This process continues until the problem is solved. At every step, each word can be tested interactively with its parameters supplied from the keyboard. Consequently, the coding and testing phase of the program development process takes as little as 50% of the time required by other languages and environments. If speed is required, time-critical words may be coded in assembler. The FORTH assembler also gives the programmer full access to the cpu and the available hardware.

FORTH is used to control assembly lines, monitor heart patients, control laser alignment, and for real-time data acquisition in observatories and hundreds of laboratories. FORTH is without peer in real-time control applications.

But FORTH is equally at home in the office. It has been used in accounting packages and large data-base systems. The last time a video game ate your quarter, you were probably blasted out of the universe by a FORTH program.

In short, no other programming tool brings as much power to small machines.

**X-FORTH** for FLEX **$149.95**

X-FORTH is an implementation of FORTH which runs under the FLEX operating system. It handles random-access files much faster than BASIC and even allows random-access to FLEX sequential files. Hundreds of program samples are supplied in source on disk. These include several editors, an assembler, data file operations, words to access all levels of the FLEX operating system, games, and a general journal. No special hardware is required. X-FORTH is supplied with a highly acclaimed 400(!) page manual.

**ccFORTH** for Radio Shack DOS **$99.95**

ccFORTH is an implementation of FORTH which runs on the Radio Shack Color Computer. Disk BASIC is required. Hundreds of program samples are supplied in source on disk. These include words which exercise the capabilities of the Color Computer, including music and sound generators, words to set graphics modes, words to access routines in the BASIC roms, in addition to the usual editors, games, and assembler. ccFORTH is supplied with a highly acclaimed 200 page manual.

**TSC FORTRAN 77 for FLEX**

FORTRAN is a high-level computer programming language. Fortran 77 requires the TSC relocating assembler and linkage editor package in order to compile and execute Fortran programs. TSC's Fortran conforms to ANSI FORTRAN-77 (ANSI X3.9-1978) subset of the FORTRAN language, with the following exceptions:

The INTRINSIC and SAVE statements are ignored.
The EQUIVALENCE statement is not implemented.
The BACKSPACE statement is only allowed on direct access files.
The ENDFILE statement performs no useful function.
Statement functions are not supported.
Direct access files are not available under FLEX.

**$375** includes the relocating assembler and linkage loader.
**$150** for assembler and linkage loader alone.

**MICROWARE BASIC09 PROGRAMMING LANGUAGE**

BASIC09 has been acclaimed as the most powerful and friendly high-level language available for any microcomputer. BASIC09 is an interactive compiler which combines ANSI standard Basic with the best features of Pascal for structured programming. BASIC09 offers an extremely powerful and easy-to-use software development environment consisting of a compiler, string-oriented text editor, and a unique high-level symbolic debugger- all perfectly integrated to give the user the friendly feel of a interpretive language but delivers the superior performance of a compiler.

* Multiple procedures with separate compilation
* Five basic data types: real, integer, byte, boolean, string
* TYPE statement Pascal-type record structures
* WHILE.. DO-REPEAT..UNTIL,LOOP..ENDLOOP, IF..THEN..ELSE statements for structured programming
* Multicharacter variable and procedure names
* Powerful Fortran-like PRINT USING statement
* Sequential and random-access file statements
* Full access to OS-9 command interpreter
* Compiles to ROMable, reentrant intermediate code
* Compact run-time-only module is optionally available

**$200.00**

**MICROWARE OS-9 PASCAL COMPILER**

A comprehensive implementation of Pascal conforming to the ISO 7185.1 standard with many natural extensions to increase its versatility and performance. OS-9 Pascal has the unique ability to generate either highly optimized assembly language source code or P-code for interpretative execution while debugging. The OS-9 Pascal package includes the compiler, native code translator, two P-code interpreters, run-time system, and a linkage editor. It features:

* Switchable ISO or Wirth/Jensen syntax compatibility
* Extensions for random-access and interactive files
* Bitwise logical operators
* Extremely fast 9-digit floating point arithmetic
* Complete run-time error handling
* Generates ROMable, reentrant native code
* Compact run-time package: 5K to 9K
* Easy linkage to machine language routines
* Full access to OS-9 command interpreter
* Virtual Memory P-code interpreter for extremely large programs
* Formatted compiler listing with comprehensive diagnostic and debugging information

**$400.00**

**MICROWARE CIS COBOL COMPILER**

The 6809 CIS COBOL compiler is the result of a joint effort by Microware and Micro Focus-the world leader in microcomputer COBOL. "CIS" stands for Compact, Interactive, and Standard: making CIS COBOL ideal for microcomputer business applications. CIS COBOL meets the ANSI standard for Level One COBOL plus selected features from Level Two and is certified as such by the U.S. General Services Administration. It features:

* Sequential, Relative and Indexed (ISAM) files
* Interprogram communication including CALL and CANCEL
* Nested IF and nested REDEFINES
* PERFORM...UNTIL statement
* ON OVERFLOW statement
* Comparison of non-numeric operands of unequal length
* Full Level One implementation of Library and Segmentation
* Includes DEBUG module
* Device-Independent Input/Output

**$895.00**

**MICROWARE FORMS 2 FOR CIS COBOL**

A time-saving COBOL program generator which facilitates fast and convenient development of interactive screen-oriented applications. The user defines screen fields and formats on-line, then FORMS 2 produces a corresponding COBOL source program. It can directly generate simple inquiry/update programs or can be used to design the interactive portions of larger application programs.

**$200.00**

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# SOFTWARE DEVELOPMENT TOOLS

# CRASMB

**CRASMB**

CRASMB is a conditional macro assembler which has the capability of cross assembling source code files for the following target microprocessors: 1802, 6502, 6800-2, 6801-3, 6805, 6809, 8080-5, and the Z-80. It does this by using 6809 program overlays called "CPU PERSONALITY MODULES" (CPM's) which are called from the command line or as an assembler directive (pseudo instruction) from within the source code file. You can now use your computer system to develop assembly language programs for a variety of CPU's. It is also possible to create new CPM's yourself for any other microprocessor. To do this you should purchase source code to one of the CPM's and with the manual you will be able to generate a new CPM. Other CPM's are in the works, so you should contact us before endeavoring on such a project. CRASMB has variable length symbols within the range of 3 to 30 significant characters.

Comment: CRASMB has been in use now for several months, and the feedback is excellent. Never has so powerful a package been offered for the 6809. The author is working on a BASIC compiler to work in conjunction with CRASMB. This infers that we would end up with a BASIC cross compiler. It's too soon to say just what form the final product will take, but I wanted you to know what was in the works. FH

Written for 6809 FLEX and OS-9

| | |
|---|---|
| FLEX | $139.95 |
| OS-9 | $200.00 |

CPM's (CPU Modules)

| | | |
|---|---|---|
| FLEX | | $ 25.00 |
| | w/source | $ 50.00 |
| OS-9 | | $ 35.00 |
| | w/source | $ 70.00 |

(CPM's available: 6800, 6801, 6809, 6502, 1802, Z80, Z8)

**OSM**

Create FLEX or OS-9 formatted binary files from either FLEX or OS-9. OSM is a MACRO assembler like CRASMB. It is compatible with TSC's Assembler, but has better MACRO control, better conditionals, and variable symbol lengths (3-30 characters). OSM makes it easy to move FLEX programs to OS-9. Now you can have MACRO capability for your OS-9 programs. This assembler is compatible with FLEX and OS-9 source files. OSM is used by the author to maintain programs on one system to keep the cost of maintenance of the same program for OS-9 and FLEX at a reasonable level. OSM was used to move CRASMB to OS-9.

Comment: If you are just switching from FLEX to OS-9, then you probably miss the power of TSC's assembler. Well OSM has all that power and more. It also makes it easier to convert your FLEX programs to OS-9, because this assembler has the same syntax as TSC's. FH

| | |
|---|---|
| Written for FLEX or OS-9 | $125.00 |
| With EDitor for OS-9 | $200.00 |

**EDitor**

ED has all the features's of TSC's editor with the addition of screen type editing, MACRO capability, and a math package. With the math package you can perform simple or complex formulas with the answer in HEX, DECIMAL, and BINARY! In its simplest form it can be used for base conversions. You can also create MACROS and pass parameters to them. Works with files larger than memory. You can even CATalog a disk. It has many additional features.

Comment: When you create a new product that has to compete with an existing product from a fine company, the only way to do it is with a better product at the same or lower price. Well ED is better and it costs the same as TSC's for the FLEX version and the SAME as Microwares in the OS-9 version. In both cases it is a better product, with more features to boot. It is the best line editor available for either system at any cost. FH

| | |
|---|---|
| For 6809 FLEX | $50.00 |
| For 6809 OS-9 | $125.00 |

**ASM Assembler**

ASM is also compatible with TSC's assembler. It has MACROS and better conditionals and variable length symbols (3-30 characters). ASM was created by taking our CRASMB program and making a 6809 only version of it.

Comment: Read the comments about ED, we needed a better assembler than the one from TSC and at the same price. We have it with ASM. The best buy in assemblers today. FH

| | |
|---|---|
| For 6809 FLEX | $50.00 |

**CROSS ASSEMBLER MACROS**

This set of macros for the TSC Macro Assembler provides the user with the capability of using a 6800/1/9 computer system for program development for 6800/1, 6805, 6502, 8080/5, and Z80 systems, using the assembler language format normally used on the target machine.

| | |
|---|---|
| FLEX | $50.00 each<br>3/$100.00 |
| UniFLEX | $60.00 each<br>3/$120.00 |

**DYNAMITE +**

DYNAMITE + is a new version of DYNAMITE that does everything that DYNAMITE does and more! A cross-reference generator has been added, label files are now maintained only in text form (LABEL EQU $xxxx), and boundary file specifications have been tremendously simplified, which makes it easier to disassemble large programs containing lots of big tables.

Written for 6809 FLEX and UniFLEX

| | |
|---|---|
| FLEX | $100.00 |
| UniFLEX | $300.00 |

**SUPER SLEUTH**

Super Sleuth is a set of programs which enable the user to examine and/or modify binary program files on disk or in memory on 6800, 6801, and 6809 systems running under FLEX (tm). Programs may be disassembled into source code format and the source may be displayed, printed or saved on disk. Labels produced by SLEUTH can be changed globally to labels of the user's preference. Cross-reference listings of labels in any Motorola assembler-formatted source file may be produced to aid in debugging or modifying the program. Programs in ROM may be altered with the revised program being saved on disk; the resultant program could then be used to program a new ROM. Object code for 6800, 01, 02, 03, 05, 08, 09 or 6502 may be processed. 6800, 01, 02, 08, 09 object code may be easily converted to 6809 position-independent code.

**Z80 SUPER SLEUTH**

This version of SUPER SLEUTH analyzes Z80, 8080, 8085 object programs. It is otherwise virtually identical to the other version of SUPER SLEUTH.

Both are written for FLEX, UniFLEX and OS-9.

| | |
|---|---|
| FLEX or OS-9 with source | $99.00 |
| UniFLEX | $100.00 |

Specify 6809 or Z-80.

**TSC TEXT PROCESSING SYSTEM for FLEX**

The Text Processing System allows the use of over 50 commands for special text formatting applications. The commands included will support multiple spacing, left margin control, indenting, the ability to save contiguous text, paging, left hand justification, centering, no-fill modes, page numbering, the printing of left, right, or centered titles, and line length control. Also included are capabilities for macro definition to define and build special formatting commands, number registers which can be used like variables in a program, conditional command execution, and text diversion for later use (such as footnote processing). The Text Editing System is recommended for use with the Text Processor since the processor contains no built-in editing functions. Program requires approximately 8K and is not position-independent or reentrant.

| | |
|---|---|
| 6800 Text Processor | $75.00 |
| 6809 Text Processor | $75.00 |
| 8080 Text Processor | $75.00 |

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TELEX 646740 · (315) 474-7856

**PL/9** by Graham Trott

PL/9 is a complete co-resident Editor/Compiler/Trace Debugger for the 6809.

PL/9 features an editor, identical to the one in "MACE", that is very quick to learn and easy to use. It loads and saves files, finds and changes strings, appends comments, inserts and deletes lines, prints selected lines on the terminal or printer, passes commands to FLEX and calls the co-resident single pass Compiler and Debugger.

Pl/9 is a TRUE COMPILER that produces PURE 6809 machine code. PL/9 does not require a run time interpreter, with its associated loss of speed and license costs (as do most BASIC's and PASCAL's) ...NOR... does PL/9 impose any license fee or restrictions in regard to its MATH module (as does TSC's Native Code Pascal). The code PL/9 produces belongs to you, and you alone...a valuable consideration if you are writing programs to sell or integrate into systems.

PL/9's Trace Debugger allows you to single step or breakpoint a PL/9 program a source line at a time examining variables as you go.

PL/9 is a structured language loosly based upon the control structures found in PASCAL, PL/M and 'C' but omitting the exotic data types. PL/9 has been specifically developed for dedicated control applications in a microcmputer environment. The language is designed to be a step up from assembly language retaining most of the flexibility and speed of the latter but making programs, particularly those with structured control arguments, shorter and more readable. PL/9 is largely self documenting owing to its ability to support variable names of up to 127 characters in length.

Functions not supported directly by the PL/9 compiler, such as disk drivers or I/O routines can easily be 'included' in PL/9 programs thus allowing the user to generate new KEY WORDS to suit his own particular requirements; a number of such functions (library modules) are included with the PL/9 compiler.

PL/9 makes extensive use of the STACK for temporary variable storage this making all PL/9 modules position independent and ROMable. Variables may also be located at fixed positions in memory to facilitate interface with hardware, programs written in other languages such as PASCAL and BASIC, and programs written by several programmers, each with his own allocated variable storage area for parameter passing/scratch.

PL/9 recognizes three distinct data types, BYTE (8-bit), INTEGER (16-bit), and REAL (32-bit...8-bit exponent and 24-bit mantissa) floating point accurate to 7 decimal digits. BYTE values may be signed (two's complement) or unsigned. The unsigned BYTE variable has been provided to facilitate the bitwise operations and comparisons that are common in digital I/O. The data types available are:

1. BYTE (signed) in the range of +127 to -128
2. BYTE (unsigned) in the range of 0 to +256
3. INTEGER (signed) in the range of +32767 to -32768
4. REAL (floating point) in the range of +/-1 E-38 to +/-1 E+38.

Data assignment operators are: 'GLOBAL' (are allocate permanent space on the stack and known to all procedures, 'AT' (a fixed absolute address), and 'CONSTANT' (allows you to equate commonly used hex or decimal values to improve readibility.

Data assignment operators are: 'GLOBAL' (are allocated permanent space on the stack and known to all procedures, 'AT' (a fixed absolute address) and 'CONSTANT' (allows you to equate commonly used hex or decimal values to improve readability). An implicit 'LOCAL' assignment operator allows temporary (scratch-pad) variables to be defined for and known by one or more procedures (these variables are not allocated permanent space on the stack).

'ORIGIN' and 'STACK' statements allows the programmer to specify where in memory his object code (on a procedure by procedure basis) and global variables are to be located.

Mathematical expressions supported are: '+', '-', '*', '/' and unary Minus '-'.

Bitwise operators supported are: 'AND', 'OR', 'EOR/XOR', 'NOT', and 'SHIFT'.

Logical operators supported are: 'AND', 'OR', and '.EOR/.XOR'.

Relational operators supported are: '=', '<>', '>=', '<=', '>' and '<'.

Address pointers are supported in the forms: '.VARIABLE, '.VARIABLE(COUNT)', '.VARIABLE(COUNT*2)', etc. ('&' may be used in lieu of '.' if desired)

Control statements are: 'IF...THEN...ELSE', 'IF...CASE1...CASE2(etc)...ELSE', 'BEGIN...END', 'WHILE...DO', REPEAT...UNTIL', 'REPEAT...FOREVER', 'CALL', and 'JUMP'.

Control statement terminators supported are: 'RETURN', 'RETURN <condition>', 'BREAK' and 'GOTO'

The 'ASMPROC' and 'GEN' statements (or special files produced by 'MACE' may be used to insert machine code inside of PL/9 procedures to obtain special functions, such as indirect addressing e.g. (JSR [D3E5]) would be coded as: 'GEN $AD, $9F, $D3, $E5;'

Some of the more powerful aspects of PL/9 include direct access to accumulators 'A', 'B' and 'D', the condition code register, and the ability to intercept the systems RAM vectors for NMI, FIRQ, and IRQ INTERRUPTS.

Written for 6809 FLEX **$198.00**

**MACE - XMACE** by Graham Trott

MACE is a complete co-resident Editor/Assembler for the 6809. XMACE is a complete co-resident Editor/Cross-Assembler which runs under the 6809 but produces object code for the 6800/1/2/3/8.

Both feature an editor that is very quick to learn and easy to use: It loads and saves files, finds and changes strings, appends comments, inserts and deletes lines, "pretty prints" lines on the terminal or printer, passes commands to "FLEX" and calls the assembler.

The assembler, which resides in memory with the editor, has 8-character labels, local labels, cross reference, multiple file assembly, listing to terminal, printer or disk file, partial assembly listing (between specified line numbers), symbol table only, object to disk or memory, extra convenience mnemonics, date and title headings on printed listings, and intelligent error messages.

Summary of features:

* Built-in comprehensive TEXT EDITOR; generally similar to the TSC editor but easier to use. An optional "pretty print" mode makes it unnecessary to insert extra spaces to seperate the assembly language fields.

* 8-character global labels to aid program readability.

* Re-usable numeric local labels to save having to invent symbol names for loops and branches. These labels do not appear in the symbol table.

* Optional cross-referenced symbol table.

* All assembly options are defined in the command line, obviating the need to edit the file for different options.

* Clear textual error messages. Assembly stops at an error, giving the programmer the choice of continuing with the assembly or returning to the editor AT THE LINE THAT CONTAINS THE ERROR.

* Multiple file assembly mode dispenses with link loading.

* Direct assembly to memory, with an optional offset, for rapid test and debugging or direct to an object file on disk when testing is completed.

* Date and Title printout on each listing page, as an aid to documentation.

* The assembler accepts all 6800/6801 mnemonics as well as several extra convenience mnemonics such as INY, CLRD, etc.

* The assembler can generate modules for use by the "PL/9" compiler as efficient library routines.

Written for 6809 FLEX **$98.00**

**MICROWARE MACRO TEXT EDITOR**

The Macro Text Editor combines a minimum-keystroke text editor with a macro-driven string processing language, resulting in a very powerful tool for creation, conversion or reformatting of text files. User-defined macros, numeric and string variables, and conditional verbs are available for creating complex text processing commands. It can also maintain and move data between multiple independent text buffers and files.

**$125.00**

**MICROWARE INTERACTIVE DEBUGGER**

A useful tool for testing and debugging machine-language programs or testing hardware. Has memory examine/change/dump, memory test, breakpointing, OS-9 command access, and a calculator mode that can evaluate and convert arithmetic expressions in decimal, binary, and hexadecimal.

**TSC DEBUG Package for FLEX**

The Debug Package is a complete, assembler language, program debugging tool capable of simulating the functions of the MPU. Up to 32 breakpoints may be defined in RAM or ROM. Each breakpoint may cause one or more of eight possible actions to be performed when it is encountered. Breakpoints may be made conditional on the exact content of a register, or on the condition of a memory location being zero or non-zero. Pass counters can be specified to delay or limit the triggering of a breakpoint. A "histogram" breakpoint allows the counting of the number of times a point in the program is reached, providing data for later program timing and optimization. During simulation, program tracing may be enabled or disabled at any time, or made contingent on subroutine nesting depth. During trace, register content and a disassembly of each instruction are displayed. Single-step and multiple-step capabilities are included. At any time, it is possible to list the previous 256 instructions executed. During simulation, sections of memory may be execute-protected, write-protected, or read/write protected. A simulation protection feature allows debugged subroutines to be executed in real-time. Execution traps permit simulation to halt on execution of interrupt-related instructions, branch instructions, subroutine nesting level, and instruction count. General features include a simple line-at-a-time assembler, disassembler, memory and register, modification commands, a two-function hex calculator, and a machine states counter for program timing. Interrupts may be simulated by the user from the keyboard or by instruction count. In all, over 50 commands are available. 6800 version is 9K in length and 6809 is 12K.

6800 Debug Package **$75.00**
6809 Debug Package **$75.00**

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### MICROWARE OS-9 ASSEMBLER

A 6809 assembler specially designed for the OS-9 environment which uses Motorola standard instruction mnemonics. Some of the capabilities are:

* Conditional assembly directives
* Automatic load module generation
* Separate data and program counters to facilitate reentrant programming, 8-character symbol names, English diagnostic messages, and attractively formatted listings.

### 6502 - 6809 TRANSLATOR

The 6502 Translator is a set of 6809 programs which processes 6502 assembler programs and translates them into 6809 assembler code. Since the translation process is necessarily complex and incomplete, a detailed theory and operations manual is provided. The user is given control over many of the decisions which must be made during the process. Those portions of the 6502 program which are known to be translated inexactly are noted.

Written for 6809 FLEX, UniFLEX, or OS-9.

| | | |
|---|---|---|
| Object with source | FLEX | $75.00 |
| | UniFLEX | $80.00 |
| | OS-9 | $85.00 |

### 6800-6809 and 6809 PIC/PID TRANSLATORS

The 6800-6809 translator converts 6800/1 assembler-language programs to 6809 assembler language programs by converting 6800/1 opcodes to sequences of one or more 6809 opcodes. The 6809 PIC/PID translator assists in converting 6809 assembler-language programs to position-independent code and data, using PC, S, U, X, and Y as base registers.

| | |
|---|---|
| FLEX | $50.00 |
| UniFLEX | $60.00 |
| OS-9 | $75.00 |

### CSC 6805 or 6502 SIMULATORS (Programs Debugging Tools)

These simulators are programs which enable the user to simulate, examine and/or modify object 6805 and 6502 program files on disk or in memory on 6800 and 6809 systems running under FLEX (tm). Programs may be disassembled into source code format and the source may be displayed or printed.

Written for 6809 FLEX and UniFLEX

| | | |
|---|---|---|
| Object with source | FLEX | $75.00 |
| | UniFLEX | $80.00 |

### UniFLEX SIMULATOR

The UniFLEX SIMULATOR provides an SWI interface which enables the user to debug UniFLEX assembler language application programs using the TSC DEBUG and other facilities of FLEX 9.

| | |
|---|---|
| FLEX | $100.00 |
| UniFLEX | $110.00 |

### OS-9 SIMULATOR FOR FLEX

The UniFLEX simulator provides an SWI interface which enables the user to debug OS-9 assembler language application programs using the TSC DEBUG and other facilities of FLEX 9. An assembler capable of producing OS-9 code under FLEX (such as OSM) is required.

FLEX $101.00

### READTAPE

This program, with an easy to make interface*, will read TRS-80 Level II BASIC tapes and convert the programs to TSC BASIC. Those things that can't be converted are flagged so that you can find them easily with a text editor. Written in 6809 Assembly language, the sources are included on the disk.

Written for 6809 FLEX

Object with source $54.95

* (instructions and schematic included - cost about $2 to build.)
(Requires use of a PIA - will not work with Color Computer)

### EDITDISK

EDITDISK is a very powerful tool for fixing problems with disks or files, for debugging applications programs with complicated file structures, and for learning about the inner workings of OS-9.

EDITDISK is a program which will allow you to look at and modify sectors on any OS-9 file or disk. Any sector of any file or disk can be displayed in both hexadecimal (base 16 or "hex") and ASCII. You can change any byte you wish by entering either the new hex value or a text string. A search command is included which allows you to search for any text string in a file or disk. You can also change the current data directory and execute SHELL from within EDITDISK.

Written for OS-9 $79.95

# UTILITIES

### FHL EXTENDED USE UTILITIES PACKAGE

Extended Utilities was designed to be used along with the already extensive list of utilities included with the FLEX operating system. These utilities include the following:

BACKUP: This is a program to create a mirror image of one diskette onto another diskette. It allows copying from any one drive to any other drive or doing a single disk copy to the same drive.

BROWSE: Browse is an enhanced LIST command, which in addition to allowing listing a text type file to the CRT or printer, also allows paging forward and backward through the file.

CRTSET: A person writing a program for his terminal which utilizes some of the special built-in functions prevents another from using the same program with a different terminal without reassembly. CRTSET was written to try to make this complication as easy to circumvent as possible. CRTSET contains 8 of the most common screen functions.

DISKDUMP: This is a program to transfer a text or basic file from disk directly to any specified port. This is useful when you want to send a file over a modem or to cassette.

INIT: This is a memory set command. It allows filling memory from 0 to FLEX's memend location with any desired byte.

LOAD: Load is a program that will load but not execute a binary file from disk to memory at the absolute address specified by the user.

SAVETEXT: This is a utility designed to allow the saving of text-type files from memory to a disk file that can then be edited using TSC's TEXT EDITOR.

READTEXT: This is the opposite of SAVETEXT. It permits reading a text-type file from disk and placing it into memory at a specified location.

REDIRECT I/O: This utility gives the user the option and ability to transfer control of FLEX to a peripheral on another port, usually another terminal or printer device with input capabilities.

RESTORE: This command returns control back to port 1 after having redirected I/O with the above command.

REPLACE: This is a program which allows you to locate and replace those port address or monitor jump locations which were not set up for your monitor in the first place.

SCAN: SCAN is a text type file list program with many refinements and enhancements designed to provide the user with the versatility he needs when looking through a file. Scan provides the user with the ability to page through the file one screen full at a time, back up a page, scroll a line at a time, backup a half page, run through the file like LIST and also stop running. The ability to jump to the top or the bottom of the file from any point within the file is also supported.

USERINFO: This is a utility written for the purpose of freeing the user of having to make notes on a piece of paper or printing small pieces of information about a particular diskette. The ability to display, edit, write, and get a current character count are included.

Written in assembler for 6809 FLEX

| | |
|---|---|
| Object only | $49.95 |
| with source | $69.95 |

### FHL FLEX Color UTILITIES

This is a combination of Toolkit #2 and Extended utilities, using only those utilities that could be used with Color Computer FLEX. Look at the descriptions for Toolkit #2 and extended utilities for information on these programs. Includes: REPAIR, SCAN, REPLACE, INIT, USERINFO, LOAD, SAVETEXT, READTEXT, DISKDUMP, LNKMAT, SEGMAT, MAP, and DINFO.

Written in assembler for FHL Color FLEX.

| | |
|---|---|
| Object only | $50.00 |
| with source | $75.00 |

### TSC FLEX UTILITIES

This package of additional FLEX utility commands includes memory dump, prompting delete, extended directory display, binary program mapper, and so on. 6800 has 36 utilities while 6809 has 17. Source is included on disk.

| | |
|---|---|
| 6800 FLEX Utilities | $100.00 |
| 6809 FLEX Utilities | $ 75.00 |

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**TOOLKIT #1**

BEDIT will allow the user to enter into the edit mode with a selected line number, make the required changes and send the line back to Basic without ever leaving Basic.

DCOMPIL will decompile XBASIC and will follow all TTYSET parameters.

BASEREF allows you to cross reference BASIC programs to provide you with additional information to write or make changes to files.

Written in Assembler for 6809 FLEX and TSC's BASIC's

| | |
|---|---|
| Object only | $49.95 |
| with source | $69.95 |

**TOOLKIT # 2**

This package is a set of utilities and programs that was developed to extend the capabilities of the FLEX operating system.

The package includes the following: REPAIR, a program designed to facilitate disc patching for the recovery of files accidently deleted or files which have a sector that cannot be read. SEGMAP, a utility designed to facilitate determining the fragmentation or scattering of the disk file or free-chain on a diskette caused by excessive creations and deletions on the disk leaving scattered files over the entire disk.

LNKMAT, a utility to re-format the disk free-chain into sequential order starting with the lowest available sector. This will increase file access times by eliminating many head seeks. FDIR, a disk directory program which allows for forward and backward directory scan of protected and unprotected files. Also allows the user to look at different drives without exiting the program and restarting again. MAP allows for display of address and size information on a file. CUSTOMIO, created to enable programs to be written using a predefined set of terminal and printer drives without regard to hardware. The program contains a table of these codes along with translation. (Will not work on Color Computer)

Written in Assembler for 6809 FLEX

| | |
|---|---|
| Object only | $49.95 |
| with source | $69.95 |

**TSC FLEX DIAGNOSTICS**

The utility programs in this package are designed to run under the FLEX Operating System. Included in the memory diagnostics portion of the package are zeroes and ones test, random pattern test, walking bit tests, dynamic RAM dropout test, and a convergence test. All memory tests are position-independent. The disk repair portion of the package contains utilities which operate on a FLEX-formatted diskette. Included are three diagnostic utilities which report unreadable sectors and structural inconsistencies among the files on the diskette, two utilities for recovering data when the directory on the diskette is not readable, a utility to remove bad or intermittent sectors from the free space, a program to retrieve deleted files from the diskette free chain, a single-sector read/write/modify routine, and a copy utility which ignores CRC errors. The manual includes descriptions of the diagnostics, some background information of types of errors, and troubleshooting guides.

| | |
|---|---|
| 6809 Diagnostics Pkg. | $75.00 |
| 6800 Diagnostics Pkg. | $75.00 |

**TSC SORT/MERGE PACKAGE for FLEX**

This allows the contents of any size file to be sorted. Written in assembler language, it is extremely fast. Sort parameters may be supplied as part of the command line, through an interactive parameter editor, or through a disk file. The package is a full-disk sort/merge, meaning that files too large to fit in memory will be broken into multiple, temporary work files which are individually sorted and then merged into one. The final output file may be routed to disk, CRT, or printer. Accepts fixed or variable length records, up to 20 ascending or descending keys, non- ASCII sequences, and much more.

| | |
|---|---|
| 6800 Sort/Merge Pkg. | $75.00 |
| 6809 Sort/Merge Pkg. | $75.00 |

**HELP**

HELP is a data retrieve utility command designed to save you hours of digging through manuals looking for information about the many computer language commands and statements. It resides entirely in the FLEX Utility Command area so it may be called from other programs.

(A short version of HELP is included with FHL Color FLEX)
Written in assembler for 6800 or 6809 FLEX.

Comment: We created HELP to add big systems feel to the FLEX system. HELP has other uses too. One user bought it because he had trouble seeing the fine print in the manuals. Others use it in CBBS's. HELP reads from a text file that you can modify, add to, or replace. HELP is very useful to the new user too. FH

| | |
|---|---|
| Object only | $29.95 |
| with source | $49.95 |

**AUTOTASK (For FLEX Operating System)**

Autotask with menu is a revolutionary new concept designed to overcome the problems and frustrations which confront the nontechnical user when using a computer. Users are greeted with a series of self-prompting interactive menus linking directly to the application. Several example menus are provided. You can create your own menus from simple text files. AUTOTASK with MENU gives you unlimited software flexibility by providing a system to coordinate multiple application programs. It uses very little memory and is easy to learn.

Autotask adds a level of power and convenience to FLEX and automated use of these systems. Either could be used to set up a procedure for running your system without the user having to have any technical knowledge of the system. If you are familiar with IBM's JPL then you know the power these programs offer.

Written in Assembler for 6809 FLEX

| | |
|---|---|
| Object only | $79.95 |
| Object with source | $129.95 |

**MCOMMAND**

A utility for converting disk resident commands to memory resident commands.

| | |
|---|---|
| Object only | $50.00 |
| with source | $75.00 |

**SPECIAL !!!!!**

MCOMMAND included free with the purchase of AUTOTASK.

**VDISK**

VDISK provides a way for FLEX users to take advantage of a large memory array. It permits a user to treat extended memory as an additional disk drive. VDISK is supplied as an ordinary FLEX disk command. Once VDISK has been executed, the user will find that he appears to have an additional disk drive. This additional drive will have its own directory and may contain program files and data files. All FLEX utilities and user programs will be able to read from and write to this drive, just as with any other drive. This "virtual" drive is extremely fast. On the other hand, it will retain its contents only so long as the computer is running. Therefore, it is necessary to copy the contents of the virtual disk to physical disk before turning the computer off.

Five additional utilities are provided to enhance the usefulness of VDISK. They include:

VASSIGN: Permits you to change the drive number of the virtual disk 'on the fly' or to temporarily disable it so that all four physical disks are available simultaneously.

VCOPY: Converts files in FLEX binary format into a special format that can be loaded at high speed from the virtual disk.

VLOAD and VDUMP: Provide you with a fast means of moving data on the volatile virtual disk to and from a nonvolatile physical disk.

VRESTORE: When VDISK is executed it changes some of the jump vectors. VRESTORE restores those vectors.

Written for 6809 FLEX $100.00

**PASSWORD**

This package will allow a user to create a system disk that cannot be booted without knowing the built in password.

Includes the following programs:

PASSGEN - This program actually makes the system disk password protected.

CODEWORD - This program prompts the user to type in his desired password. It can be used at any time to change the existing password.

DPASWORD - This program displays the current password to the screen.

INITS - This program must be included in the startup text file of your system disk in order to call the password program into effect.

Written in assembler for 6809 FLEX.

| | |
|---|---|
| Object only | $69.95 |
| with source | $89.95 |

**FULL SCREEN FORMS DISPLAY**

The Full Screen Display package supports any serial terminal with cursor control and memory-mapped video displays. The package substantially extends the screen input/output capabilities of X-BASIC programs by providing a simple, table-driven method of describing and using full screen displays. These table entries are easy to set up and maintain, and are normally stored on disk and read as required. A simple, interactive means of generating the forms and the data field definitions is provided.

Written in TSC's Extended BASIC for 6809 FLEX or UniFLEX.

| | |
|---|---|
| FLEX | $50.00 |
| UniFLEX | $75.00 |

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**SOME COMMOM BASIC PROGRAMS**

A direct Xbasic translation of all 76 programs that comprise Lon Poole's and Mary Borcher's popular book. This software provides indepth subroutines you can incorporate in your programs, or just run the programs as they come. Included are 24 financial programs, 4 common subroutines and mathematical and statistical programs. Some programs have added FLEX printer routines. Their clarity of structure and abundant REM statements make them great self-study tools. The APPLE II (tm) version of the book is recommended for documentation.*

From the Osborne book by the same name.

Written in TSC XBASIC for FLEX.

Object with source $69.95

* Since no two Basic's are identical, some programs provide accuracy similar to the documentation.

**SOME PRACTICAL BASIC PROGRAMS**

Fourty new and very helpful programs edited by Lon Poole. Included are 16 business oriented programs, plus programs for home use, more common subroutines plus mathematical and statistical programs. Don't keep re-inventing the wheel. Newly translated to XBASIC.

Written in TSC XBASIC for FLEX. $69.95

**PLOT**

PLOT is a program designed to give you neatly formatted plot with the best resolution possible. It will plot histograms, bargraphs, XY plot plus others.

Options are available for automatic scaling, forced limits, log-linear, linear-log, log-log, linear-linear scales, adjusting the size of the graph, a repeat of the graph in a different format, highlighting of particular values, printing of parallel plots.

This program requires approximately 10K in text form or 7.5K when "compiled" by TSC BASIC.

Comment: This program is designed to added to your programs. It is called by putting your data in a virtual array on disk and calling PLOT. It does not use nor does it require special graphics printers. FH

Written in TSC XBASIC for 6809 FLEX

Object with source $44.95

**ESTHER**

ESTHER is ELIZA plus. Artificial intelligence in pure 68XX code. Her source shows you how. Her object will amaze your friends. ESTHER: remembers names, drops them, uses the player's name, and even echoes keywords. ESTHER identifies more than 75 keywords and uses almost fifty sets of replies. A few of the sets contain as many as 21 replies to help her avoid redundancy. ESTHER features auto line length and runs in FLEX (tm). She obeys TTYSET. She is both educational and fun. ESTHER, written by 68 MICRO JOURNAL Contributing Editor, Dale L. Puckett, is the result of a two year long experiment with artificial intelligence in 68XX assembly language programming. ESTHER randomly inserts the players name in the conservation. Occasionally, she uses part of the player's reply in the middle of her answer or next question. ESTHER has the ability to echo keywords. This allows her to respond to replies from the player which are in the third person. ESTHER identifies proper nouns and uses them in her replies. She also saves them for later use.

Written for 6800 and 6809 FLEX

Object $ 39.95
w/source $ 59.95

**FOR YOUR INFORMATION!!!!**

Frank Hogg Laboratory, Inc. has customers and dealers all over the world. A short listing of some of our customers in the U.S. includes:

Aydin Microware, National Institute of Health, NASA, Becton Dickinson, Fermilab, Harvard University, Allied Chemical, Xerox Corporation, Eastman Kodak, Notre Dame University, Yale University, University of North Carolina, Bethel College, Honeywell, General Motors, Union Carbide, Columbia University, Western Electric, Westinghouse and many more.

# DATA BASE MGM'T SYSTEMS

**UDRI DATA BASE MANAGER FOR THE COLOR COMPUTER**

**Data Base Manager Part I:**

A) Creates Data Base files which can be updated or modified at any time.

B) Prints reports with operator setting print parameters and selecting fields to be printed.

C) Compresses and sorts files.

D) You can have up to 32000 records in a Data File, up to 36 fields in a record, up to 252 characters in a field.

**Data Base Manager Part II:**

A) Prints any size or number of mailing labels.

B) Edits the file header for any Data Base compatible program.

C) Transfers data from one file to another.

D) Modifies data contained within a file using conditional operations.

E) Creates keyfiles for doing sorts.

Requires TSC Extended Basic

For Color Computer FLEX :

Database Manager Part I Compiled..... $ 99.00
Source.....Add $ 50.00
Database Manager Part II Compiled.... $ 99.00
Source.....Add $ 50.00

**RMS RECORD MANAGEMENT SYSTEM**

RMS is a complete Database Management package for the 6809 computer. It is made up of five machine language programs that make up the most powerful business programming tool for the 6809. It can be used by the relative novice to implement an incredible variety of information storage and retrieval applications, without any programming, such as accounting, management information systems and customer or personnel records. The programmer can use RMS as part of the solution to a larger problem, saving many hours of unnecessary program development time. RMS can be used to handle data input, editing, validation, on-line retrieval, sorting and printed reports. It includes the following features:

* User defined record format via data dictionary
* Screen oriented, form fill-out type of access
* Optional Two Level Record Hierarchy
* All files in ASCII Text format, BASIC compatible
* Direct access by key field, multiple index files
* Extensive documentation, sample application
* Versatile, professional quality report writer
* Built in sort/merge

For the Color Computer $200.00
FLEX
OS-9

**INFOMAG**

INFOMAG is a data base management system specifically designed for microprocessor based computer systems.

It is a collection of menu-driven programs developed to manage data for specific applications such as Inventory, Order Entry, Customer Lists, Accounting, Mail List, Patient Records, Library Records, Geographic data, Site Records, Payroll.

Infomag is Information Management by Groups and contains the following features:

* Data base may contain multiple master files
* You can define and work with subgroups of the master database.
* You can sort by groups
* An audit trail can be maintained.
* Password Protection
* Columnar reports, modular reports, reports drawing from primary and secondary files
* Statistics reports
* Database files can be accessed by user written BASIC programs.

FLEX $295.00
UniFLEX $395.00

**UDRI DATA BASE MANAGER**

The UDRI Data Base Manager System (DBMS) is a menu driven package of programs designed to allow the operator the ability to create files, add and change information at any time, organize the file in a variety of ways, and print a multitude of reports and labels.

The DBMS allows the operator to enter a group of parameters to make the programs compatible with any terminal. The files are created in a way to make the most efficient use of your storage medium, and the amount of information stored in a file is only limited by the size of this storage.

Total flexibilty is maintained from the start, where the operator creates a file with fields to handle alphanumeric information, floating point numbers, or integers. Up to 36 different fields may be created in one file.

Once created, data may be added or modified at any time. Data is normally maintained in the order that it is entered, but may be sorted by any of the fields created. Keyfiles are also provided to allow the file to be left intact and also give you the option of having reports or mailing labels printed in any order you may need.

Complete file maintenance is provided, where the operator may review the file, add, modify, or delete records at any time.

New files with different fields can be created from old ones, with pertinent information passing from one to the other thereby minimizing duplication of entry.

Compatible files can be merged and sorted allowing different entry points to be annexed.

The report program allows the option to print on CRT, printer, or to a sequential file. Print parameters may be saved for easy access at a later time. Conditions may be set to allow a report to print only the information needed. Numeric fields can be totaled, with page totals at the bottom of each sheet, and a grand total provided at the end of the report.

The label printing program provides any number of labels per line and any number of lines per label. The labels can be printed meeting any number of conditions (up to 20), in file order, or in keyfile order.

The possibilities are limited only by your imagination.

The DBMS provides ease of flow from one program to the next, and an operator need not be a skilled programmer to operate it.

Requires TSC Extended Basic

FLEX **$150.00**
UniFLEX **$250.00**

# BUSINESS APPLICATIONS

**OSBORNE BUSINESS PROGRAMS FOR ACCOUNTS PAYABLE, ACCOUNTS RECEIVABLE, and GENERAL LEDGER**

This enhanced implementation of the Osborne and Associates Business Programs is the only implementation available with the full capability of the original Wang Minicomputer version.

FEATURES INCLUDE:

* KEYED FILES to eliminate slow searches and sorts.
* PASSWORD and MASTER PASSWORD PROTECTION to limit unauthorized access to your business data.
* LINKED can be run linked to G/L

ACCOUNTS RECEIVABLE: This package is an open invoice system, it prints aging reports, monthly statements, open item listings, etc. You can maintain trade discount schedules and scheduled penalties for late payment.

FLEX **$295.00**
UniFLEX **$395.00**

ACCOUNTS PAYABLE: This package is an invoice-linked system, it prints aging reports and will print out your checks.

FLEX **$295.00**
UniFLEX **$395.00**

GENERAL LEDGER: Accepts postings to the various accounts from external sources: Accounts Payable, Accounts Receivable, and Cash Journal. The normal posting is double entry to reduce off-balance posting errors.

FLEX **$295.00**
UniFLEX **$395.00**

**COMPUTERWARE GENERAL ACCOUNTS RECEIVABLE SYSTEM**

This system can be used by manufacturing, wholesaling, or retailing businesses. The system takes full advantage of the random access capability by updating directly on-line the information for an account, invoice, and payment. Thus all inquiries against a customer always show up-to-the-minute status.

The system records key information for all customers. This includes the customer's name, title, address, city, state code, zip, phone number, terms and credit limit. An account may be added, changed or deleted at any time. If the balance data is modified or an account deleted, an audit record is generated for reporting purposes.

Invoice information is maintained for each customer. This information consists of invoice number, invoice date, invoice amount, payment date, and payment amount. Open invoices are maintained in the system until payment is made. Payment of invoices may be made by invoice number or applied to the oldest outstanding invoice. The invoice may be adjusted at payment time to allow for slight over/under payments. The adjustments will have an audit record generated for reporting purposes.

Reports may be requested at any time and will always show the customer's current financial status, as entered into the system. The reports available are: Account Cross Reference, Account Master, Account Summary, Account Overdue, Account Aged, Payment Forecast, and Audit Trails. The Account Aged Report shows the customers financial status broken down by categories of current, 30 days, 60 days, 90 days and over 90 days. The account overdue report shows only the customers which are past 30 days in paying. The Payment Forecast shows all current Accounts Receivable in date sequence so you can evaluate your future cash flow at a glance!

Written for 6809 and requires Computerware's Random Basic.

CoCo FLEX **$149.00**

**UDRI THE BALANCED BILLING SYSTEM**

The Universal Data Research Inc. Balanced Billing System provides a menu driven, easy to use billing package designed to aid in sending invoices to customers and keeping records of amounts owed. The Balanced Billing System is a user friendly system written to create and maintain its own data files, provide reports, and print invoices and mailing labels. Some of the features of this package are:

1) Customer file may contain any number of customers.
2) Easy to use programming concepts that allow adding, deleting, and editing of files at any time.
3) Use as either a regular or balanced billing system:
   a) Regular billing to collect all charges with 1 bill
   b) Balanced billing to divide charges into any number of payments
4) Mailing labels and invoice programs to hasten mailing of invoices.
5) Report on all customers' billing status, including current amount due, total past due, and total due.
6) All programs and files are Database compatible.

Requires TSC Extended Basic

For Color Computer FLEX **$99.00**

**BILLPAYER SYSTEM**

The BILL PAYER SYSTEM is a complete household financial package, designed for everyday use. It maintains your records so you can pay bills, helps you to budget, writes and addresses your checks and reports the status of both paid and unpaid bills. Then, when you purchase by mail, a PURCHASE ORDER sequence keeps track of what you ordered, when and to whom the order was placed. For income tax purposes (or budget analysis) each bill may be divided into numerous accounts. It now becomes possible to know what you have spent that your household requires.

The BILL PAYER SYSTEM also records your income, very handy when you have multiple income sources. Your accounts may be maintained automatically but, most important, you may enter figures from your checkbook and cash purchase receipts, too. In other words, THE BILL PAYER SYSTEM is designed for use. It is a complete, correlated household financial system. And, to round out the system, a series of "Explore" programs are included. These programs maintain check registers, analyze your bills' aging and more. Most people are pleasantly surprised. The BILL PAYER is not just another piece of software. It is one reason why you own a microcomputer.

It is designed for either FLEX2 or FLEX9 operation. The documentation is comprehensive. Although designed for household purposes, the BILL PAYER may be helpful for very small businesses.

Comment: The Billpayer is the most comprehensive system for the home that I have seen. I am surprised at the number of people using it for small business at home. FH

Written in TSC XBASIC for FLEX

Object with source **$169.95**

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## COMPUTERWARE PAYROLL SYSTEM

The Payroll Processing System was designed to take full advantage of the random file access capability, so the user can do direct on-line updating and inquiry of selected items. This technique provides the fastest possible response time and most efficient means of space utilization. The direct updating of employee information, hours worked, wages, and deductions means that any inquiry for a selected employee will provide up-to-the-minute payroll status on that employee.

The Payroll Processing System records key information on all employees. This includes name, address, social security number, phone number and start date information. The entry of pay rates for standard hours, overtime hours, and salary is provided. The system handles hourly, salary and commissioned employees as well as weekly, bi-weekly, semi-monthly, and monthly pay periods. Two miscellaneous deductions are allowed per employee which may be applied as either a rate per hour worked, a percent of gross wages, or a flat dollar amount per pay period. A separate deduction is allowed for payment against a cash advance.

A special feature of this system is password protection. Since payroll information is private in nature, you can control its access by changing the password at anytime.

Another feature provided with the system is the automatic handling of vacation and sick hours. Based upon the user's company policy, vacation and sick hours accrue either as a rate per hours worked, or on the employee's anniversary date. Time charged against vacation or sick hours will automatically reduce the amount available. Also, when inputing the hours worked for an employee, the hours can be assigned a job account for labor distribution. A choice of labor distribution reports can be reported in several different sequences.

Once all activity for each employee has been entered, generating the payroll is reduced to pressing a few keys on the keyboard. You may choose to run the full payroll or only a select portion. Gross wages, FICA taxable wages, federal withholding taxes, state withholding taxes, FICA taxes, SDI deductions, and net wages are then calculated quickly and accurately. The Payroll Year-to-Date File is updated with current, month-to-date, quarter-to-date, and year-to-date information.

You have the option of viewing this information on the terminal screen or selecting one of the ten (10) reports provided with the system. The reports can be requested at any time and will always show the latest employee information and dollars totals. The Employee Master Report shows standard employee information including name, address, phone number, exemptions (state and federal) and pay type. Activity input Forms may be printed to facilitate the accumulation of hours for the pay period. The capability to print address labels for each employee is provided to easily process company mailings. A Year-to-Date Audit Report may be generated to aid in documenting the payroll deductions and wages paid during the year. The capability is provided to print check stubs with current wages and deductions as well as year-to-date totals. The Payroll Register Report lists hours and dollars for each employee for the current pay period. A Tax Register Report may be requested at the end of each quarter to determine total SUI, FUI, FICA, and federal income taxes payable. Government required W-2 and 941 Reports may also be printed.

All of the reports can be sorted by employee number, social security number, employee name, or state code. The user may choose to report all active employees or select on a specific type, such as hourly, salary, weekly, bi-weekly, semi-month-ly, or monthly. Reporting may also be limited to ranges within the report sort sequence.

A table feature allows the user the luxury of changing tax rates and maximums as often as the government changes its requirements. SUI, FICA, FUI, and SDI rates can easily be changed through Table Processing. Federal witholding ranges can also be modified without having to reprogram the system City or local tax rates may be entered into the table and applied to employee earnings when necessary.

Written for 6809 and requires Computerware's Random Basic.

CoCo FLEX **$295.00**

## READTEST

Readtest is a must for all writers and writing instructors. The program actually reads a text file that you prepared and tells you how well it was written. The program will tell you who is most likely to read and understand your copy and what type of publication would most likely buy your story.

Written in Assembler for 6800 or 6809 FLEX.

| | |
|---|---|
| Object only | **$54.95** |
| with source | **$74.95** |

## FULL SCREEN MAILING LIST

The full screen mailing list system provides a means of maintaining simple mailing lists. Using a random file structure based upon the first character of the name field, it maintains the file in alphabetical order for easier inquiry. With the FIND command, the user may locate all records matching on partial or complete name, city, state, zip or attributes. Printed listings and output to labels may also be produced on the same selective basis.

Written in TSC's Extended BASIC for 6809 FLEX or UniFLEX.

| | |
|---|---|
| FLEX | **$100.00** |
| UniFLEX | **$110.00** |

## UDRI PAYROLL PACKAGE

The UDRI Payroll Package is a flexible system designed to meet your payroll needs. The system features user defined fields for the following:

1. Payroll hours including regular, overtime and four additional fields for vacation, sick, etc.
2. 5 types of payroll additions - two non-taxable fields and three taxable fields for bonuses, commissions, expenses, etc.
3. 7 types of payroll deductions for hospitalization, uniforms, etc.

The system defined fields are:

1. Standard deductions - federal, state, FICA, withholding, and disability. Tables are system maintained but can be easily updated by user when necessary.
2. Gross and net pay.

Payroll records for each employee include:

1. General information - name, address, phone, date of birth, and social security.
2. Pay rate.
3. Employee number.
4. Department number - up to 20 different departments.
5. Last check.
6. Year-to-date values.

Reports include the following:

1. Employee list - sorted numerically or alphabetically.
2. Check printing with paycheck information - using standard NEBS check form.
3. Summary of all paychecks printed.
4. W2 information.
5. Quarterly employee check history.
6. Federal and state depository information.
7. Company totals for any pay period or group of pay periods (monthly, quarterly, or annually) including a department by department total.

The system generates all information necessary for the various federal and state financial reports.

Requires TSC Extended Basic

| | |
|---|---|
| FLEX | **$295.00** |
| UniFLEX | **$395.00** |

## UDRI SINGLE ENTRY LEDGER SYSTEM

The Universal Data Research, Inc. Single Entry Ledger system provides a menu driven, easy to use, General Ledger package primarily designed for a cash basis accounting system.

Written with the user in mind, this system of programs creates and maintains its own data files, and provides a variety of reports necessary to run your business. The programs provide complete traceability for all entries with the ability to add, change, or remove entries, if needed.

Some of the features of the Single Entry System are:

1) Data files may contain any number of accounts and any number of transactions (limited only by the size of your storage medium).

2) Easy to use programming concepts that allow adding to files, editing files, and deleting from files at any time.

3) A variety of reports including:

   a) A report of all accounts showing, in account number order, a year-to-date value as well as a total for new transactions.

   b) A report of all accounts, in numerical order, not including new transactions.

   c) A report of all accounts, again in numerical order, comparing this year year-to-date values with totals from last year.

   d) A report of all recently entered transactions listed by account number.

4) Compatibility with the UDRI Data Base Manager.

5) Flexibility for other uses, including:

   a) The ability to use the Single Entry System as a check balancer.

   b) The ability to use this system as a double entry system.

Requires TSC Extended Basic

| | |
|---|---|
| For CoCo FLEX | **$95.00** |
| FLEX | **$100.00** |
| UniFLEX | **$125.00** |

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## COMPUTERWARE ACCOUNTS PAYABLE SYSTEM

Computerware's Accounts Payable System can give you the tools to plan your business' growth by controlling expenditures and forecasting cash requirements. This system helps a small business manage and track its cash liabilities by collecting vendor invoice information and reporting the business' cash committments and payment history.

And the system is easy to use. General Information is stored for each vendor. As an invoice from a vendor is received, the pertinent information is entered into the system. The vendor summary fields are automatically updated, keeping all totals current at all times. Payments are entered by invoice number, invoice date, or applied against a vendor's oldest invoice. Again, vendor summary fields are updated automatically. Now, with a simple report request or on-line inquiry, you can have a concise list of all your outstanding bills - or a summary of a vendor's account - or a report showing how much you've spent this year with each supplier - or a list of all your current payments - or,...in other words, you can see how you've been spending your money, how well you've kept your credit committments, and what you will need to continue to meet your business needs. You're in CONTROL!!

Information maintained for each vendor includes name address, phone number, terms extended, current balance due, total of invoices received during the current period, total amount paid during the current period, year-to-date paid total, and last activity date. The system stores the invoice number, vendor, invoice date, invoice amount, ledger account code, remarks, paid date, paid amount, and payment document number for each invoice entered. Reports include Account Cross Reference, Account Master, Account Summary, Accounts Past Due, Payment Forecast, and Activity. They may be sorted by vendor number, vendor name or invoice date with range selection available for selective reporting.

Written for 6809 and requires Computerware's Random Basic.

CoCo FLEX **$195.00**

## COMPUTERWARE CHECK LEDGER SYSTEM

The Check Ledger System is a single entry bookkeeping system which allows the user to define multiple income and expense accounts. Deposits are assigned to income accounts while cash disbursements by check are assigned to expense accounts. Multiple expense assignments may be made for a single check, allowing easy recording of petty cash, credit card payments, etc.

A chart of accounts code may be assigned to group various expenses into categories (The expense account codes can correspond to the federal income tax forms line number. By using this number, filling in the tax forms can be reduced to moving the figures from your report to the form.)

Year-to-date dollar totals are maintained for every account. This means an account always reflects the current dollar total. All activity entered into the system is recorded and applied against the checkbook balance and the appropriate account. The system automatically maintains the checkbook balance and will reconcile upon request. Means for nine different types of automatic payments is provided. Manual adjustments of an account for correction purposes is provided.

The computer can provide you accurate detailed or summary reports of your income and expenses at any moment. These extensive reporting capabilities offer the following reports: Detail Account, Summary Account, Year-to-date Account, Written Checks, Outstanding Checks, Adjustments, and Deposits. Several sort sequences are provided and ranges within the sequences allow selective reporting. Subtotals are provided where applicable and grand totals are always printed.

The Check Ledger System can be interfaced with Accounts Receivable System, Accounts Payable System, and Payroll System for a complete general bookkeeping system.

Written for 6809 and requires Computerware's Random Basic.

CoCo FLEX **$195.00**

## INVENTORY with MATERIALS REQUIREMENTS PLANNING

The full-screen inventory and MRP system is based upon the full-screen forms generator. It provides a convenient means of maintaining small inventories. Using a linked, keyed random file structure based upon the item field, it keeps the file in alphabetical order for easier inquiry. With the FIND command, the user may locate all records matching on partial or complete item, description, vendor, or attributes. Items in backorder or below minimum stock levels may be located through the same process. Printed listings and item labels may also be produced on the same selective basis. The printed output may be produced in item or vendor order. A materials requirement planning (MRP) capability for manufacturing environments is included to allow the maintenance and analysis of hierarchial assemblies of items in the inventory file.

Requires TSC's Extended BASIC

Written in 6809 XBASIC for FLEX.

FLEX **$100.00**
UniFLEX **$150.00**

## UDRI ACCOUNTS PAYABLE / PURCHASE ORDER / VENDOR PROGRAMS

The Accounts Payable program is used in conjunction with the Vendor and Purchase Order programs allowing for total control and tracking of transactions. Some of the unique features of the package are:

*Screen oriented menu selection.
*Files can be updated at any time.

**The Vendor Program:** Assigns vendor numbers automatically. Will print a vendor list and directory in numerical or alphabetical order. Allows for three different quantities on a vendor quote. A year-to-date business listing can be printed and file can be cleared at year end.

**The Purchase Program:** Automatically prints Purchase Orders after entering and updating. Each Purchase Order has 6 line items, with every line item having three separate comment lines. Open order reports can be printed by individual vendor, for all vendors, by date issued, or date due. They may be duplicated at any time as long as they are open.

**The Accounts Payable:** Will post Purchase Orders or Post Payables directly. It will issue Debit Memos, Cash Disbursement Report as well as issue checks, verify checks, and write reports as follows:

A) AGED ACCOUNTS by vendor, date issued, or due
B) JOURNAL REPORT
C) CASH DISBURSEMENT
D) CASH REQUIREMENT
E) ACCOUNTS PAYABLE PROJECTION

If the General Ledger program has been purchased...the totals can be directly posted to the General Ledger Posting file.

Inventory information can be accessed if this package is accompanied by the Inventory Program.

All programs and files are Data Base Manager compatible.

Requires TSC Extended Basic

FLEX **$295.00**
UniFLEX **$395.00**

## COMPUTERWARE INVENTORY CONTROL SYSTEM FOR RETAILERS AND DISTRIBUTORS

Computerware's Inventory System is easy to use so a member of your staff can do the work, leaving management time to review and set upon the information provided. To receive inventory, just type the part number and how many you received. Instantly your inventory is updated! To relieve inventory just type the part number and how many had been sold or transferred to another location. To change pricing, vendor, or any other information for an item, just enter the part number. The computer shows the current information and asks you what you want to change. As soon as you enter the new information, your computer is up-to-date immediately! And if you want to know something about a particular item, just type in the part number and the computer will display all of its information for you. It is much quicker than even a well organized file cabinet!! If you add a new product or discontinue one from your product line, that too can be entered quickly. The key is to easily keep your inventory information up-to-date and give management valuable and accurate information with which to make decisions.

For each item, the following information is stored:

Part number
Category
Part name
Vendor Name
Vendor Product Code
Quantity at Location 1
Quantity at Location 2
Quantity at Location 3
Quantity at Location 4
Minimum On Hand Quantity
Quantity on Order
List Price
Unit Cost
MFG Suggested Price
Sale Price
Sale Flag
Quantity Sold in Month X
Date Last Sold

Now that the computer has all of this valuable information, it is presented to you in nicely formatted reports that summarize the figures you need for decision making. Following is a list of reports. Each report is available in two formats. The first format requires a printer that can print 132 columns across the page. It includes information separated out by each location. The second format does not require 132 columns but only 80. It provides the information in combined format, giving the information for any one location or summarizing all location totals together as Location 5. If you are not using the different locations but are only using one location, they will effectively be the same. The one exception is the Year-to-Date Monthly Sales Report. This requires 132 columns and shows sales for all 12 months and a total figure.

You can receive the following reports: General Inventory Report, Cost Extention List, Retail Extention List, Profit Margin Report, Re-Order Report, Price List, Count List, Year-to-Date Monthly Sales.

Written for the 6809 and requires Computerware's Random Basic.

For CoCo FLEX **$195.00**

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## UDRI FOUNDRY PACKAGE

- ORDER ENTRY
- PRINTING OF PRODUCTION WORK ORDERS AND CUSTOMER ACKNOWLEDGMENTS
- INVOICING PATTERNS AND POSTING CASH RECEIPTS
- GENERATING MAINTENANCE WORK ORDERS FOR ROUTINE MAINTENANCE OF HEAVY EQUIPMENT

ORDER ENTRY...Orders are entered by customer number and pattern number. If pattern is in file, all necessary data concerning weight, price, and material is retrieved from file, or else all pattern data is input to the system and the pattern is added to the file during order entry. Orders can be modified and cancelled at any time as necessary.

CUSTOMER ACKNOWLEDGMENTS...Acknowledgments can be printed for each open order to confirm order.

WORK ORDERS...Production work orders are printed for each new pattern ordered...including a comment field so that additional information can be included. Duplicate work orders can be printed for any open order, if necessary.

INVOICING...Invoicing is done by pattern number (pattern number must be for a unique customer) and all open orders for a particular pattern are displayed with due dates to allow selective invoicing. Up to three additional lines are allowed per invoice to accommodate extra charges such as heat treating or painting.

POST PAYMENTS...Cash receipts are posted against Open Accounts Receivable and the Accounts Receivable file is updated.

HEAVY EQUIPMENT MAINTENANCE...System allows for generation of timely maintenance of heavy equipment. Maintenance routines are added for each machine with performance intervals (expressed in weeks) and work orders are generated for each machine requiring maintenance for a specified ending date.

PATTERN PROGRAMS...Allows modification of pattern file.

REPORTS...The following reports are generated from the system:

A) Production Control Report - Open Orders By Customer
B) Accounts Receivable Report - Aged
C) Sales Journal Report - By Date
D) Pattern Report
E) Machine Report - General Information
F) Machine Report - Suppliers
G) Maintenance Schedule Report
H) Maintenance History Report

DATA BASE COMPATIBLE...All data files are compatible with Universal Data Research Database for designing customized reports.

Call for price.

## COMPUTERWARE CORRESPONDENCE SYSTEM

The Correspondence System is simple to use. The system collects name and address information, and then provides mailing labels and reports of the entire list or subgroups within the list upon your request. You can add names, delete names or change information for a given name at any time, keeping your list accurate at all times.

The information stored for each entry includes:

Name
Address
City
State
Zip Code
Title or Country
Phone Number
Special Codes
Special Date
Sort Name

There is no system limitation on the number of names the Correspondence System can handle. Only your computer disk storage limits your number of names. You can also have as many different lists as you wish. Up to 5 different lists can easily be used on a single disk.

The real power of the system lies in the Special Code and Date Information you can enter. The Special Code may contain up to 17 characters. Each character can designate a special meaning or you can use it as a description. The selection feature of the system allows you to sort out any group of your list by any one or combination of these 17 characters. So, you can very selectively reach portions of your larger list! You may also select on the basis of date, zip code or sort name.

This system is not new. It has been well tested for many years with data bases from 15 to 7000 entries. It has been useful to retailers, wholesalers, clubs, churches, professionals, and personal users. You will be pleased to see how effective you can be when you can reach people, the right people, in a timely manner.

Written for 6809 and requires Computerware's Random Basic.

CoCo FLEX **$149.00**

## UDRI CHURCH CONTRIBUTIONS SYSTEM

The Universal Data Research, Inc. Church Contributions System provides a menu driven, easy to use contributions package primarily designed to facilitate the tedious task of recording envelope collections. Written with the operator in mind, this system of programs creates and maintains its own data files, and provides a variety of reports. Some features of this package are:

1) Data files may contain any number of contributors.

2) Easy to use programming concepts that allow adding, editing, and deleting of files at any time.

3) A variety of reports including:

a) A master contributions report showing alphabetically totals for all contributions (weekly, monthly, and specials) for the quarter, as well as year-to-date.

b) A contributor's report designed to fit in a window envelope for their tax purposes. This report will also include the amount pledged for the year as a gentle reminder.

c) A system of programs designed to hasten the entry of envelopes collected.

d) A report of all envelopes entered for a particular collection designed to catch the obvious erroneous entry.

e) A breakdown of envelopes collected showing the number containing less than $5.00, those between $5.00, $10.00, $20.00 and those over $20.00.

f) A quick reference listing showing contributors in alphabetical order and one showing them in envelope number order.

4) All programs and files are Data Base compatible.

For CoCo FLEX **$99.00**
FLEX **$145.00**
UniFLEX **$245.00**

## DYNACALC

Enhance your computers productivity with a powerful software tool for planning, manipulating data, and probing alternatives. With DYNACALC, you don't have to be a programmer. You simply enter your data and equations onto a giant "electronic spread sheet", and the answers appear as if by magic. Then play "What if .....?" Change a data point or two, and watch the new answers appear almost instantly!

DYNACALC includes full 16-digit arithmetic for scientific and financial calculations. A full complement of formats is available for string, numeric, and bar graph displays. DYNACALC's powerful sort command allows you to rearrange your worksheet by columns and rows. You can keep track of the many built-in commands and functions with DYNACALC's on-screen HELP messages. Some of the functions included are SIN, COS, TAN, LOG ( and their inverses), X, Y, SQRT, INT, ROUND, ABS, MIN, MAX, SUM, AVERAGE, COUNT, LOOKUP, INDEX, and NPV (net present value.) DYNACALC uses super-fast 6809 machine code to guarantee its high performance. DYNACALC can read and write FLEX data files, which allows it to communicate with other programs on your system, and of course DYNACALC talks to your existing printer.

Comment: We went out and purchased books for the VisiCalc system by Visicorp. We were able to use the examples in these books with very minimal modification, and only syntax modification at that. If you have been wanting a VisiCalc like system for your computer than wait no longer, here it is. FH

Written for 6809 FLEX and UniFLEX.

Object only **$200.00**

## ELEMENTARY JOB COSTING

Job Costing need not be limited to big business. Our Elementary Job Costing Program allows small businesses to account for numerous items. Be it repairing cars, baking wedding cakes, remodeling homes or just keeping track of your personal expenses, this program will total 997 different jobs in addition to Unknow and Miscellaneous categories.

Each job is given to the computer from a source document (such as an invoice). If more than one job is given on the invoice, for example, an average cost is applied to each job. An optional control entry allows double-checking of the input for errors. A single report is generated. First, each job and its total are displayed. Second, each job is re-displayed by job number, source, source date and source amount. This allows for record documentation as well as a fast way to spot input errors in case the jobs are out of balance.

The Elementary Job Costing Program comes with XBasic source code for FLEX 2 and FLEX 9. Also available for the Color Computer.

Written in TSC's Extended Basic for FLEX.

Source included **$95.00**

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# STYLOGRAPH
# 6809 WORD PROCESSING SYSTEM

## AVAILABLE FOR FLEX,™ UniFLEX,™ and OS-9™

The STYLOGRAPH text processing system is a very easy to use but powerful method of creating and printing text. It allows the operator to type text on the CoCo, modifying and correcting it as it's typed, and then print it out. The STYLOGRAPH SYSTEM is cursor-oriented with dynamic screen formating. Cursor based editing means that any portion of the text may be worked on by moving the cursor to that point. Dynamic screen formating means that the text is formated on the screen in the same way it will appear on the printed copy. The display is continuously updated to show how the text will appear. This is a very important feature and is normally available only on very expensive commercial word processing systems. It significantly reduces the time required to produce a finished copy.

### FULL FEATURED TEXT EDITING

A full array of commands help in the creation and modification of text. The text displayed on the screen may be moved up, down, left or right. The cursor can be moved to any page or to any specified series of letters or words. The cursor itself can be moved left, right, up, down, to any tab position, or to the extreme left or right. Any block of text can be moved, copied or deleted. The operator may also do a **global replace** so that all occurrences of a given string will be replaced with or without a "prompt" asking if the item should be replaced.

### OPERATOR CONVENIENCE

Files longer than memory can be edited. The operator can move forward through a long text file by selectively dumping text to the disk or filling from the disk.

The supervisor mode is **menu driven** and self prompting so that the operator does not have to remember the syntax of commands. This makes it easier for new operators to use the system.

An "assist" or **"help" function** makes it easy to learn the system since it is normally not necessary to consult the manual to learn the commands. This function is menu driven and lists all of the keyboard functions and the formating commands.

At the beginning of the text the operator normally types in a few simple commands indicating the line length, left margin, and so forth, and then enters the header and footer as they should appear. After that the operator need not worry about formating since it is taken care of automatically. Words that extend beyond the end of the line are automatically removed and placed on the next line. **Headers** and **footers** are automatically inserted so that the operator always knows what portion of the page is being worked on. **Ghost hyphens** can be entered so that if the word falls at the end of a line, and a ghost hyphen has been inserted, the hyphen will automatically be added.

### FLEXIBLE DISPLAY

Lines longer than the screen width are allowed. STYLOGRAPH can scroll right and left on the screen so that tables can be constructed and appear on the screen exactly as they will appear on the print out.

A command allows viewing of the formating commands on the screen. Another command allows the operator to see which characters will be modified at print out by underlining, superscripting or boldface. A page status command shows the current format values and other useful information.

### COMPLETE FORMATING CONTROL

The text of individual lines may be centered, left justified, right justified, or right and left justified. **Tabs** can be set or cleared at any point. Spacing of the lines on the page is under complete operator control with end of page, spacing and vertical tab commands.

While entering text, it may be specified that the characters have some kind of modification when they are printed, such as underlining, superscript, boldface, overline, or subscript. These character modifications are done with "control" key strokes. For example, to start underlining characters, simply hold down the "CTRL" key, hit the "U" key and continue entering text. To stop underlining, hit the "DEL" or "RUB" key.

### POWERFUL PRINTING OPTIONS

Underlining is supported on TTY type printers. For those people who have specialty printers there are a variety of additional capabilities including:

1.5 line spacing
**BOLDFACE**
superscript$^{1}$
subscript$_{2}$
underline, overline,
or any combination

Right and left justification of text is accomplished by incremental printing on TTY type printers. True proportional spacing is supported on the specialty printers.

Control codes may be embedded in the text for special applications. For example, some printers require special control sequences for double width, graphics or boldface. These sequences may be embedded in the text for those users that have these printers. In conjunction with this, it is possible to cause the printer to stop in the middle of a print out for changing printwheels. A backspace feature allows overstriking.

### OPERATING SYSTEM COMPATIBILITY

STYLOGRAPH is compatible with the FLEX, UniFlex, and OS-9 disk operating systems. Text files prepared using STYLOGRAPH are directly usable by other software such as BASIC and the assembler. (This significantly aids software development since cursor-based editing allows full viewing of the text being worked on, thereby reducing errors and decreasing programming time). File size is limited only by the capacity of the disk system. Files may be loaded into the text at any point making it possible to rapidly create "boiler plate" documents using portions of text that have been previously saved to a text file. Any portion of a text may be saved to a text file for use at a later point. The printer output may be directed to a disk file for later print spooling. Most operating system commands are directly accessible without leaving STYLOGRAPH.

### FULLY ADAPTABLE TO MOST PRINTERS

STYLOGRAPH is easily configured by the user for most terminals so there is no need to send for updates as equipment changes are made. Source code of the terminal interface is supplied so that users with unusual equipment configurations may adapt it to their systems. The source code for all of the "prompts" is also supplied so that foreign language versions may be easily constructed.

Printers currently included as standard are: Diablo, Qume, Starwriter, NEC 5515/25, NEC 5510/20; CENTRONICS 737/739; TTY type printer with backspace function; TTY type printer without backspace function.

### COMPLETE INSTRUCTIONS

A special tutorial section is included in the manual so that people with little or no computer experience can easily learn to use STYLOGRAPH in a few hours. A text file is included which demonstrates most of the features of STYLOGRAPH and allows the operator to practice most of the functions. The logical arrangement of the commands and the immediate display of the results greatly simplifies the learning process. In addition there is an "assistance" command which helps the new operator learn the commands.

### STYLOGRAPH MAIL MERGE

A major option of STYLOGRAPH is the related MAIL MERGE program. This program adds "form letter" capability to STYLOGRAPH. Variables such as names addresses, dates, may be taken from a disk file or the keyboard at print out time and inserted into the text. Successive letters may be printed out without operator intervention.

The second important capability of the MAIL MERGE program allows many STYLOGRAPH text files to be appended at print out time. This allows files to be edited in smaller, more convenient blocks and then appended at print out time so that the page numbers will remain consecutive and the headers and footers will automatically be retained through all of the print out.

### STYLOGRAPH SPELLING CHECKER

Another major option of STYLOGRAPH is the related SPELLING CHECKER program. This program reads through a text file and compares the words in the file with a dictionary. Words that are not found in the dictionary may be marked in the text for later editing, corrected on the spot, skipped, or added to the dictionary. Words may be added to or deleted from the dictionary to create unique vocabularies for particular applications.

**STYLOGRAPH for the Color Computer FLEX ..... 195.00**
**STYLOGRAPH MAIL MERGE ..... 125.00**
**STYLOGRAPH SPELLING CHECK ..... 145.00**
**STANDARD FLEX Version ..... 295.00**

FRANK HOGG LABORATORY

NOW AVAILABLE FOR FLEX

# DynaStar WORD PROCESSING SYSTEM FOR OS-9

## OS-9 USERS:

If your computer has a SCREEN and you're still struggling with an editor that only knows about LINES, then obviously YOU don't know about

## DynaStar

DynaStar is a powerful, menu-driven screen editor equally suited to the tasks of program preparation and document processing. With the addition of the optional DynaForm print formatter, it is the best word-processing package you can buy for your OS-9 system.

DynaStar Version II is now available and features no-nonsense "what you see is what you get" editing for virtually any terminal with or without cursor addressing (it must be at least able to go to "home"). To edit, simply place the cursor where you want it, and type. Any printable character you type is entered directly into your text, and any non-printable control character causes immediate execution of an editing command. Single keystroke commands permit movement of the cursor in any direction, by character, tab, word, line, or screen full, and deletion of characters, words (left or right) or a whole line. Two keystroke commands augment this set by moving the cursor to the left margin, top or bottom of the screen, beginning or end of the edit buffer, or the beginning of the next paragraph. You can search for any string, replace with any other, do it again, mark original blocks of text, copy, move or delete blocks, read or write to side-files, set tabs and margins, or center the current line.

DynaStar features automatic word-wrap, and it can right-justify text as you enter it so you will see exactly how it will look *before* you print it. If you later make alterations or change the margins, you can reform the text a paragraph at a time with two keystrokes. For programmers, there is a special automatic indent mode to help you write well-structured code. DynaStar includes a Shell command which lets you do almost anything (including edit another file) without even losing your place in your current document, and it permits editing of large disk files in stages without forcing you to break up your files.

If you want to define more powerful commands, DynaStar includes a macro facility which lets you convert any control character to one or a string of characters of your choice. You can use this feature to create global search-and-replace commands, insert "boiler-plate," or simply re-map your keyboard. You can also provide a special "start-up string" which is automatically executed whenever you enter the editor to set up modes such as auto-justify, display a directory, define your favorite macros, or re-map the keyboard.

For complete word-processing, we offer our DynaForm text formatter which provides all the standard features such as pagination, headers and footers with page numbers, single space, double space, multiple space, **bold face**, **double-strike**, and <u>underline.</u> DynaForm has its own macro facility with string variables, nested include files, a full merge-print capability for generating form letters and mailing lists, and it can generate an index automatically, sorted alphabetically or by page number. You can call it from DynaStar to proof-print the active edit buffer, or by itself to print a disk file while you edit another.

| | |
|---|---|
| DynaStar II: OS-9 or FLEX | $149.95 |
| CCFLEX Version: | $ 90.00 |
| DynaForm text formatter: OS-9 or FLEX | $149.95 |
| DynaForm CCFLEX Version: | $ 90.00 |
| Both purchased together: | $275.00 |
| Both CCFLEX Versions: | $175.00 |

**AVAILABLE FOR FLEX 9**

## DynaSpell

From Dale Puckett

## FOR OS-9 AND FLEX

DynaSpell is the most versatile 68XX spelling checker available.

MENU'S MAKE OPERATION EASY. From the menu you may: Print a list of suspect words; Print a list of valid words; Check each suspect word one by one; Read your text, stopping to check suspect words; Use additional dictionaries for more thorough checking or special applications; Build an additional dictionary of newly accepted words; Write correct text file to disk.

While checking you may: Accept the suspect word; Accept and save in the dictionary; Replace with correct spelling.

Designed to be used by the layman, DynaSpell is right at home in the office. Ease of use and speed will recover the cost in days.

22,000 word dictionary covers the first 25,000 entries in the American Heritage listing of the most common English words.

500 built in common words (and, or, the, etc.) and 300 specific to your field, filters the text and allows a large file to be processed even in small computers.

**PRICE $199.00**

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# INTERESTIN' STUFF

**This article first appeared in the Feb 1982 issue of CCN.**

## 32K RAM FOR FREE!

"How to run Pascal, C, and Cobal, not to mention XFORTH, esther, and spelltest, on the TRS-80 COLOR COMPUTER"

Someday, as the Honeywell advertisement would say, integrated circuit processing will become so inexpensive that computer memory will be available for free.

That day is today, for owners of the Radio Shack TRS-80 COLOR COMPUTER.

The story begins with my early production model (with a 3-digit serial number) of the 4k color computer. Its logic board had some extra wires and things on it, indicating that the design was not quite perfected when it was produced. I heard that radio shack would replace the board with a newer version if I purchased their 32k ram upgrade for $149.00, so I decided to give it a try.

When I took the computer to the local computer center, I was told that the upgrade would only cost $99.00. I did learn, however, that radio shack is unwilling to work on a computer which has a modification in it, even if the mod is electrically disconnected. They did complete the upgrade, and indeed they did install a new logic board, containing eight memory chips with unrecognizable part numbers on them.

Various rumors have been circulating about how the 32k upgrade is accomplished. it is not done by piggybacking 16k rams! Neither is it done by installing 32k rams, as radio shack contends.

The 32k dynamic ram was actually only available for a short time. These parts were actually attempts at 64k parts that were only half-good, or they had some bad bits in one half or the other. The 32k upgrade was originally designed to take advantage of these parts - a jumper exists on revision E of the color computer circuit board to select which half of the 64k dynamic ram is accessed.

Since then, memory manufacturers have learned how to produce 64k chips with sufficient yield to drive the cost lower than you or I, or radio shack, expected. these chips are available by mail order, in small quantities, for less than $12.00 each. radio shack can certainly buy them in quantity at a lower price.

The astute reader will have guessed the punch line by now. The 32k color computer actually contains 64k rams! I am not in a position to guarantee this, of course, but so far it seems to be the case. I will now tell you how the "other 32K" might be useful to you.

## USING THE FULL 64K RAM.

None of the versions of radio shack color basic know how to use the other 32k. As a matter of fact, this memory is not available to the cpu at all in an unmodified color computer. This is due to an easily correctible omission in the design of the computer.

The dynamic memory in the color computer is controlled by a chip known as the sam, or synchronous address multiplexer. The sam bears the Motorola part number 6883, or 74ls783. The sam takes care of refreshing the rams and interlaces the access cycles of the cpu and the video display so that no "specks" occur on the screen. The sam must be programmed differently for 4k, and 16k, and 64k rams. (this is why color basic 1.1 was written - version 1.0 didn't know about 64ks.) the sam also provides address decoding for the three roms, as well as the i/o hardware.

As the sam was being designed, Motorola considered the possibility that it might be useful in systems which did not use rom, but might want to use 64k of ram (minus 256 bytes for I/O, etc.) For this reason the selection of rom in the sam is programmable. If you whisper the right thing to the sam (POKE &HFFDF,anything), the roms will go away, at least in theory, leaving behind nearly 32k of clean, untouhed ram.

Well, we need a more sophisticated theory, because it doesn't quite work. The sam will still try to select the roms if the cpu writes to those addresses, regardless of how it is programmed. I guess motorola must have thought that this decoding might be used for something - clearly it wouldn't hurt, since the system designer would have to provide logic to prevent the roms from being turned on in a write cycle anyway. (the rams are "selected" for write purposes all the time.)

Radio shack, on the other hand, didn't see things the same way; they figured they would avoid writing to that area, so no problems would result. As a matter of fact, the first thing color basic does (after programming the sam) is to test the memory from zero until it finds a byte that won't write. when this test hits address &H8000, the cpu tries to write the roms with exactly the opposite data they contain, and at the same time the roms are reading - resulting in two different chips trying to put different data onto the same bus at the same time.

The real tragedy is that a few unused nor gates exist on the color computer circuit board. You only need one of these to solve this problem. (radio shack designers - take note.)

## THE MODIFICATION IS REVERSIBLE.

One of the extra nor gates must be connected into the circuit as shown in figure 1. this modification disables the selection circuitry (G2B high) if a write is attempted (r/w low) and a rom is addressed (r/w low). If you have some experience with fine soldering, you can accomplish this modification in a reversible fashion, allowing you to run to radio shack if your color computer breaks. Warning - you must remove that nasty sticker on the back, thus voiding your warranty (if you're still covered), to get inside.

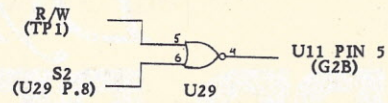


**FIGURE 1. MODIFICATION TO TRS80CC FOR 64K RAM**

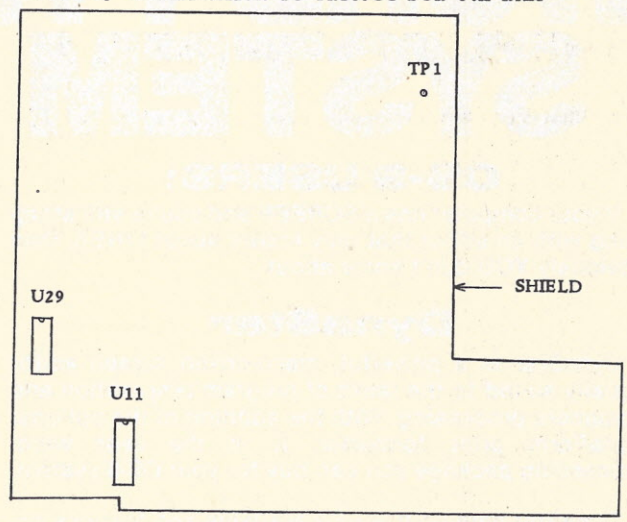


**FIGURE 2. LOCATION OF COMPONENTS**

The procedure is as follows. remove the case and the top of the rf shield, on the right behind the keyboard, you should be able to find the ic's and TP1 as shown in figure 2. They are also marked on the board. U11 is a 74LS138, and U29 is a 74LS02.

You may wish to obtain a new 74LS138 and a 74LS02, so you can save the "originals" for a rainy day. in reality radio shack probably doesn't remember what brand of ic it put in your computer, but precautions are cheap. Anyway, carefully remove those two ic's, (they are not especially sensitive to static.) bend pins 4, 5 and 6 of the 74LS02 up in the air, as shown in figure 3. They must be almost straight up so they don't touch the shield. similiarly disfigure pin 5 of the 74LS138. (be gentle!)

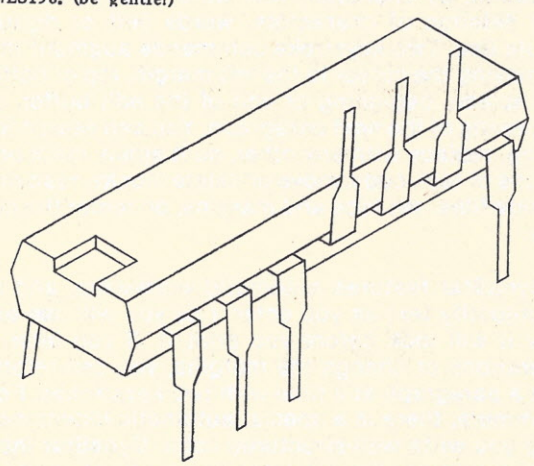

**FIGURE 3. MODIFIED 74LS02 PACKAGE**

Next, using a short piece of 30-gauge wire, connect pin 6 of the 74LS02 to pin 8. pin 8 must plug back in, so try not to get solder down on the pin - you should tack the wire on the very top of the pin, where it enters the package. if it doesn't come out right, buy another 74LS02 - it costs much less than a new computer.

You can do the rest of your soldering either before or after you plug the chips back in; use your own judgement. Pin 4 of the 74LS02 must be connected to pin 5 of the 74LS138, and pin 5 of the 74LS02 must be connected to TP1. I recommend that you do not solder to TP1. just use a wire wrap tool to wrap the wire around the pin, so it can be pulled off.

After you have reinstalled the ic's, the wiring should appear as in figure 4. check carefully for shorts!



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# TEN MOST-ASKED QUESTIONS

# ABOUT DYNACALC™

## THE ELECTRONIC SPREAD-SHEET FOR 6809 COMPUTERS

1. **What is an electronic spread-sheet, anyway?**
   Business people use spread-sheets to organize columns and rows of figures. DYNACALC simulates the operation of a spread-sheet without the mess of paper and pencil. Of course, corrections and changes are a snap. Changing any entered value causes the whole spread-sheet to be re-calculated based on the new constants. This means that you can play, 'what if?' to your heart's content.

2. **Is DYNACALC just for accountants, then?**
   Not at all. DYNACALC can be used for just about any type of job. Not only numbers, but alphanumeric messages can be handled. Engineers and other technical users will love DYNACALC's sixteen-digit math and built-in scientific functions. There's even a built-in sort command, so you could use DYNACALC to manage small data bases - up to 256 records.

3. **What will DYNACALC do for ME?**
   That's a good question. Basically the answer is that DYNACALC will let your computer do just about anything you can imagine. Ask your friends who have VisiCalc, or a similar program, just how useful an electronic spread-sheet program can be for all types of household, business, engineering, and scientific applications.

4. **Do I have to learn computer programming?**
   NO! DYNACALC is designed to be used by non-programmers, but even a Ph.D. in Computer Science can understand it. Built-in HELP messages are provided for quick reference to operating instructions.

5. **Do I have to modify my system to use DYNACALC?**
   Nope. DYNACALC uses any standard 6809 configuration, so you don't have to spend money on another CPU board or waste time learning another operating system.

6. **Will DYNACALC read my existing data files?**
   You bet! DYNACALC has a beautifully simple method of reading and writing data files, so you can communicate both ways with other programs on your system, such as the Text Editor, Text Processor, Sort/Merge, RMS data base system, or other programs written in BASIC, C, PASCAL, FORTRAN, and so on.

7. **How fast is DYNACALC?**
   Very. Except for a few seldom-used commands, DYNACALC is memory-resident, so there is little disk I/O to slow things down. The whole data array (worksheet) is in memory, so access to any point is instantaneous. DYNACALC is 100% 6809 machine code for blistering speed.

8. **Is there a version of DYNACALC for MY system?**
   Probably. You need a 6809 computer (32k minimum) with FLEX or UniFLEX operating system. A version for OS-9 is also in the works. You also need a decent CRT terminal, one with at least 80 characters per line, and direct cursor addressing. If your terminal isn't smart enough for DYNACALC, you probably need a new one anyway. The UniFLEX version of DYNACALC also allows you to mix different brands of terminal on the same system. There's also a special version of DYNACALC for Color Computers equipped with FLEX.

9. **How much does DYNACALC cost?**
   The FLEX versions are just $200 per copy; UniFLEX version $395. Foreign orders add $10 per copy for postage. We encourage dealers to handle DYNACALC, since it's a product that sells instantly upon demonstration. Call or write on your company letterhead for more information.

FRANK HOGG LABORATORY

# ORDER YOUR DYNACALC™ TODAY

CSC

### ALSO FROM FHL

**DYNAMITE +**
**"THE CODE BUSTER"**

**now available for UniFLEX**
**OS-9 version soon**

DYNAMITE + is a new version of DYNAMITE, our popular 6809/6800 disassembler package for 6809 FLEX. Present users of DYNAMITE can upgrade to DYNAMITE + by sending us the original DYNAMITE diskette and $40 (plus $5 for foreign postage). DYNAMITE + does everything DYNAMITE does, and more! A cross-reference generator has been added, label files are now maintained only in text form (LABEL EQU $xxxx), and boundary file specifications have been tremendously simplified, which makes it easier to disassemble large programs containing lots of big tables.

The UniFLEX version of DYNAMITE + does everything the FLEX version does, and also automatically handles system calls and 'info' areas.

DYNAMITE + is available for $100 per copy on FLEX (specify diskette size), and $300 on UniFLEX. Foreign orders add $5 per copy for postage.

continued from page 18

At this point you can turn on the computer and do a "PRINT MEM." if it says the usual number, all is probably well, so put it back together.

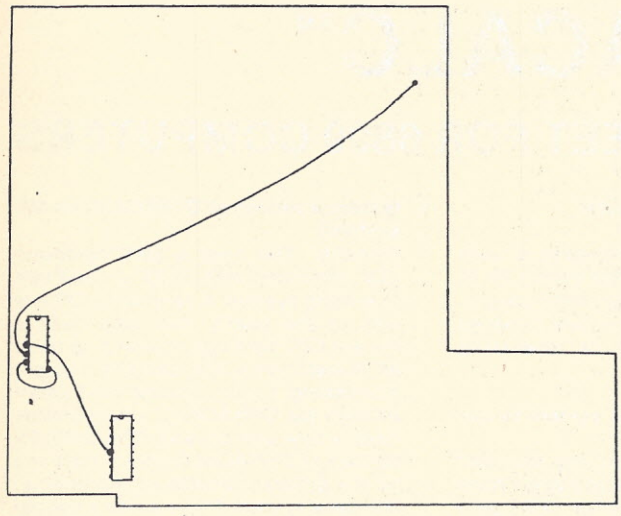

**FIGURE 4. INSTALLED MODIFICATION**

**TESTING YOUR NEW FREE MEMORY.**

The extended color basic program in listing 1 will test the ram which you have just made available. save it before you try to run it, because if you mistype one of those data statements, anything can happen. the program will take about a minute to get set up, after which it will print "ok" if your memory is good. if you do have a problem, it will tell you the address and the data read from the ram, compared to what was expected. I would like to hear from you if you do find errors. If the errors occur in only one or two bit positions, they can be fixed with one or two 64k rams, for one or two ten-dollar bills. No big deal.

**WHAT DO YOU DO WITH IT?**

You now own a computer with almost 88k of memory, in a box no bigger than a typewriter. this fact alone may be enough for some of you. However, a large collection of software exists which can now be run on your computer.

The most important item in this collection is the popular FLEX operating system. (FLEX is a trademark of Technical Systems Consultants, Inc.) Frank Hogg Labs has developing a package which will allow FLEX to be run on the 32k color computer, with the radio shack disc system, and the modification described above. FLEX will reside in memory at addresses &HC000-&HDfff, as always. addresses 0-&HBFFf will be available for user programs. addresses &HE000-&HFFEF will be available for utility programs. (we have an enhanced display package, using hi-res graphics to simulate a 51-by-24 screen. that's better than an apple!)

With FLEX you have a whole cosmos of software available to you. besides the items mentioned in the subtitle, there are basic compilers, business programs, adventure games, assemblers and text editors, word processing software, machine-language debug programs, disc system diagnostic packages, and too much more to mention. FLEX is an excellent system which is widely supported.

**SUMMARY**

The 32k upgrade of the radio shack trs-80 color computer is accomplished by installing 64k dynamic ram chips. With a simple, reversible modification, nearly all 64k of this ram can be utilized. A package has been developed which will allow the FLEX operating system to be run on the modified 32k TRS-80CC with disc. You can do a lot of stuff with that.

This article was prepared, using a preliminary version of the FLEX package, on a color computer.

□

**Reprinted from Color Computer News**

64K KORNER

By Frank Hogg

This seems to be turning into a habit, so I've settled on the name '64K Korner' for this column. What we are going to cover here pertains to using 64K RAM in your CC and the different things you can do with it.

One of the questions frequently asked about the 64K mod is what happens to the ROM when you switch to 64K. This has proven to be very difficult to describe over the phone, so in order to make it easier to visualize, we've made up some memory maps of the color computer. In Fig 1 is the map of the 'normal' color computer. This is similar to what you will find in the manual that comes with the CC. Notice the ROM at the middle of memory. This is what we are going to turn off. Note also the areas of memory down low where the screen is and the Basic storage area. These are designated by the ROM and when it is turned off, we can move these wherever we want. One final thing to spot is the area above ROM which is empty. There's no memory there at all.

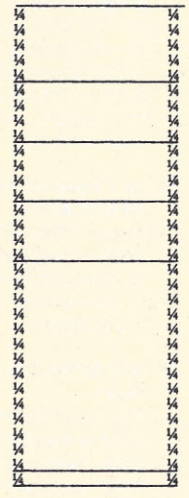


Figure 1 'Normal Color Computer'

Now, let's turn the ROM off and see what we have. Notice that the I/O stayed where it was and everything else disappeared! This is why you must have something in memory before you turn the ROM's off. Otherwise, nothing will happen. So on to figure 3.

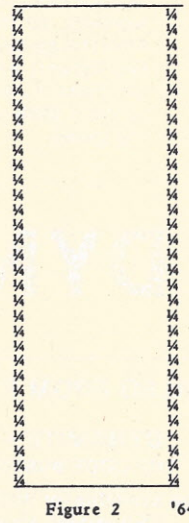


Figure 2 '64K Color Computer'

Now we come to where you can really do something with that 64K. In figure 3, we are showing you the memory map for our FLEX disk operating system on the color computer. With this system the memory is much better utilized. Notice that you have 48K of user memory, as opposed to just over 30K. Also, the RAM above FLEX is used for a multiple screen output and a high res output with 24 lines by 42 characters per line.

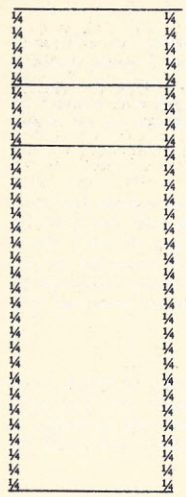


Figure 3 'FLEX Color Computer'

The color computer is quite unique among the so called appliance computers. The CC is the only one with the ability to get rid of the ROM and switch on 64K RAM. This is a very powerful feature of the CC that has not had a lot of attention given to it.

If you are a Basic programmer and never want to change to anything else, the ROM Basic may not get in your way. So why is it such a big deal? Suppose you want to do something different with your CC other than programming in Basic --- word processing for instance. With 64K you can have a much bigger workspace than with 30K. How about using a different language like Pascal or FORTH? The idea is that with a ROM based system you are stuck with that ROM whether you use it or not. In the CC you can do anything you want because you can turn the ROM off. Tell that to someone with an APPLE or Atari and see how they handle it.

The power that's hidden in that little gray box is quite surprising. Let us try to unleash it.

Frank Hogg

□

**Memory Test**

This test is from the October 1982 issue of Color Computer News, page 68. It is patterned after a program published by FHL in the February issue of Color Computer News. This program was written by Jim Brown, 31 Richie Drive, Pleasant Hill, CA 94523.

Basic initialization and machine code load require about 3 seconds. Full range test time for good RAM takes less than 3 seconds.

```
 10  '  TEST MEMORY IN MODIFIED
 20  '  32K TRS80 COLOR COMPUTER
 30  '  FOR FULL 64K ADDRESSING
 40  '  RANGE WHEN MAP TYPE=1
 50  '
 60 CLEAR 50,&H3000
 80 B=&H1D00: '  RELOCATION BASE
100  '  MACHINE CODE:
120  '  SETUP & CLR MEM
130 DATA 34011A50B7FFDF4F
140 DATA AE8CEBA780AC8CE8
150 DATA 23F943
160  '  WAIT FOR REFRESH
170 DATA 8E02A0301F26FC
180 DATA 8E02A0301F26FC
190  '  MAIN LOOP
200 DATA AE8CD26384A184
210 DATA 27028D1F6380
220 DATA AC8CC723F11F894D
230 DATA 271A
240  '  MID LOOP
250 DATA AE8CBB4FA1842702
260 DATA 8D096380AC8CB1
270 DATA 23F320C8
280  '  EXIT SEQUENCE
290 DATA E6843540EF8CAC
300 DATA ED8CA7AF8CA2
310 DATA B7FFDE3581
320  '  RESUME SEQUENCE
330 DATA 34011A50B7FFDF
340 DATA EE8C97AE8C90
350 DATA A68C8F6EC4
370  '  DEFINE CONSTANTS
390 H$="&H"
400 SA=B+&H00:'START ADDR
410 EA=B+&H02:'END ADDR
420 XA=B+&H04:'EXIT ADDR
430 DA=B+&H06:'RD/WR DATA
440 E0=B+&H0A:'START ENTRY
450 E1=B+&H67:'RESUME ENTRY
460 LA=B+&H78:'LAST CODE BYTE
470 DEFUSR0=E0:DEFUSR1=E1
490  '  LOAD MACHINE CODE
510 FOR A=E0 TO LA
520 IF HX$="" THEN READ HX$
530 POKE A,VAL(H$+LEFT$(HX$,2))
540 HX$=MID$(HX$,3,255)
550 NEXT
570  '  INPUT LAST MEM TEST BOUNDARIES
590 PRINT "LOWEST,HIGHEST:";
600 PRINT "3000,FEFF"
610 PRINT "LOWER,UPPER BOUND";
620 INPUT I$,J$
630 BT=VAL(H$+MID$(I$,1,2))
640 POKE SA,BT
650 BT=VAL(H$+MID$(I$,3,2))
660 POKE SA+1,BT
670 BT=VAL(H$+MID$(J$,1,2))
680 POKE EA,BT
690 BT=VAL(H$+MID$(J$,3,2))
700 POKE EA+1,BT
720  '  TEST MEMORY SEGMENT
740 X=USR0(0)
760  '  PRINT TEST RESULTS
780 WD=PEEK(DA):RD=PEEK(DA+1)
790 IF WD=RD THEN 960
800 FA=PEEK(XA)*256+PEEK(XA+1)
810 PRINT"ADDRESS:";HEX$(FA);
820 PRINT"WROTE";HEX$(WD);
830 PRINT"READ";HEX$(RD);
850  '  RESUME TESTING
870 X=USR1(0)
890  '  LOOP BACK FOR REPORTING
910 GOTO 780
930  '  END OF CURRENT TEST
940  '  ALLOW FURTHER TESTING
960 PRINT"TEST COMPLETED"
970 PRINT
980 GOTO 590
```

For loop testing,
replace 980 with:
980 GOTO 780
Hold <BREAK> key for about 6
seconds to break the test loop.

**COLOR COMPUTER 32K RAM UPGRADE**

The installation procedure for the ram upgrade will vary depending on the revision level of the circuit board. Revision B or C boards cannot be upgraded. The revision letter is found on the right side of the board between the RFI shield and the cart. slot.

PARTS LIST

The rams used can be damaged simply from the discharge of static in the human body. Try to rid yourself of static charge. Avoid making contact with pins. Do not perform upgrade on carpeting. Avoid unecessary movement that would cause you to produce static charge.

8 EA. 64K RAM CHIPS; 1 EA FERRITE BEAD; 1 EA JUMPER PLUG.;1 ea jumper plug.

REVISION 'D' PROCEDURES

1. Remove the following capacitors. C61, C31, C64, C35, C67, C45, C70, C48.

2. Move the jumper at the right of U10 to the 16K position and remove the jumper plug between U8 and U4.

3. Make the following cuts and add the following jumper wires to the PC board.

| CUTS | JUMPERS |
|---|---|
| +5V to pin 9 of the rams | +5V to pin 1 of the rams |
| +12V to pin 8 of the ram | +5V to pin 8 of the rams |
| -5V to pin 1 of the rams | U4 pin 12 to U8 pin 17 |
| | U10 pin 35 to pin 9 of the rams |

4. Note the position of notches on top of U20-U27. Remove and install 64K chips in their places. DONE.

FRANK HOGG LABORATORY

THE REGENCY TOWER
770 JAMES ST. · SYRACUSE, NY 13203
TELEX 646740 · (315) 474-7856

## FHL SOLVES YOUR HARD(WARE) PROBLEMS

### DISK SYSTEMS

We are now stocking TANDON and TEAC disk drives in addition to cables and Radio Shack Controllers for the Color Computer. Of course we have 64K CoCo's too.

### TANDON DRIVES

For over a year we have been recommending Tandon disk drives for the CoCo. They have proven to be very reliable. Also with FLEX they can be run at the faster 6ms stepping speed. Radio Shack drives on the other hand step at a slow 30ms. I also like the door on the Tandon better than the Radio Shack drive. The TANDON door is a straight forward door, where the Radio Shack is a 'pop open with a bang' type of system. The last thing to consider is the Tandon is a 40 track drive compared to Radio Shack's 35 track. So with the combination of 5 times faster stepping and the 5 extra tracks, the Tandon is a much better buy than Radio Shack drives. By the way the Radio Shack drive is 48 tracks per inch like the 40 track drive, but they only use 35 tracks because it is harder to read and write to the inner tracks and that is why Radio Shack chose not to do so. It makes for cheaper manufacturing costs.

FLEX treats both sides of the drive as one drive automatically. When you use the Radio Shack DOS, it just uses 35 tracks on one side of the drive. This makes the 40 track drive compatible with Radio Shack 35 track drives. You could format a 80 track disk with Radio Shacks DSKINI on the Radio Shack DOS but it would only use 35 of the 80 tracks, just like the 40 track drive, but because the tracks are closer together (96 tracks per inch as opposed to 48 tracks per inch) a standard drive will be unable to read the disk. In like manner the 80 track drive cannot read a 40 track disk. Some people have access to or own a standard drive and use that to copy from the 80 to the 40 track and back.

The Tandon drives are available in single or double sided, 40 and even 80 tracks. See the discussion below on choosing drives for your system. TANDON is supposed to be releasing a 1/2 height version of their drives soon. Call about them.

### TEAC 1/2 HEIGHT DRIVES

In January I picked up 2 TEAC half height drives for evaluation. I installed them on my home system. (a 64K CoCo) These drives are very very nice. They even look nice on the inside. I am tempted to put a clear plastic cover on them to show off the fine workmanship inside. The drives have a nice working lever type door that makes it easy to insert and remove the disks. They even have a head load solenoid so that when the drive is not being accessed the heads are not against the disk. They come mounted in a horizontal rather than a vertical case. I didn't think that I would like that at first, but it is very nice and now I've grown to like it better than the vertical mount. They only use 1/2 the power of the full size drive and are therefore cooler running. They cost about $50 more per drive than the full size Tandon but they are worth the extra cost if you want a smaller overall system size. They run at the same stepping speed as the Tandon and seem to work just as well. They are available as 40 track double sided or 80 track double sided. The case holds 2 drives, although we can sell them with only one drive and a filler plate until you get the other drive. The cable for the 1/2 height case is different from the standard case.

### CHOOSING THE BEST DRIVE TYPE

The standard Radio Shack drive is a 35 track single sided drive. This is all the ROM based DOS will support. This DOS also steps the drives at the slow stepping speed of 30ms. This is true even if you use drives that can step faster because it is in the ROM and can't be easily changed. If you do not plan to upgrade to FLEX, which can use the bigger capacity drives, and faster stepping rates, then there is little reason to buy the Tandon or TEAC drives. You will get a better quality drive than what Radio Shack sells, but I would question the need for the extra expense. However if you are going to upgrade to FLEX then the whole picture is different. FLEX will support all the drives listed here, from 35 track single sided drives up to double sided 80 track drives, and everything in between.

I used 2 double sided 40 track drives on my personal system for years with little need for more capacity. However if you feel the need for more storage than get either a third 40 track or get 80 track drives to begin with. Check the table below for the capacity of the different drives. One thing to consider is that a typical FLEX system would have 2 drives. Some fellows use 3 drives but most use only two.

We plan sometime in the future to make a provision in FLEX to do what is known as double stepping. This way we could read and write a 40 track disk with an 80 track drive. However the technique is only about 80% successful because of drive alignment and could not be used with the Radio Shack DOS.

So pick the capacity that you need from the table below, and buy the drive(s) that will do the job. Remember it is better to have two drives of smaller capacity than one drive of larger capacity. Doing a single disk copy and backup is a long tedious task with one drive, but having two drives of like size makes the job of backing up a snap. Remember, that if you want only one double sided drive, you can only have a max of 3 drives on the system. We have to use Radio Shack drive 3 select, which is the side select from the controller, when you use double sided drives.

### DISK CONTROLLER

We now stock the Radio Shack Disk Controller. However we have to pay a lot for the skimpy manual for the Radio Shack DOS. If you don't need it, just buy the controller. The controller is housed in the Radio Shack plastic case, but there is no label. We used to buy the controllers in a metal case but the cost was high and I can't see any difference between them as far as RFI goes. The plastic case looks better than the metal one.

### BITS and PIECES

| | |
|---|---|
| 64K Color Computer with Extended Basic | **$599.00** |
| Radio Shack Disk controller with manual | **$200.00** |
| without manual | **$185.00** |
| Set of 8 64K 200ns dynamic RAMs w/inst. | **$ 99.00** |
| Disk Cables - Specify single or double sided | |
| 2 drive cable | **$ 25.00** |
| 3 drive cable | **$ 30.00** |
| 4 drive cable | **$ 35.00** |
| TEAC 2 drive cable | **$ 20.00** |

### COMPLETE SYSTEM PRICES

**SAVE on Complete Systems**

64K Color Computer, Ext Basic, Disk Controller, cable and Tandon Single sided 40 track drive and FLEX.

| | |
|---|---|
| With 1 Single Sided 40 | **$1,195.00** |
| With 2 Single Sided 40 in the same case | **$1,499.00** |
| With 1 Double Sided 40 | **$1,299.00** |
| With 2 Double Sided 40 in the same case | **$1,699.00** |
| With 1 Single Sided 80 | **$1,299.00** |
| With 2 Single Sided 80 in the same case | **$1,699.00** |
| With 1 Double Sided 80 | **$1,399.00** |
| With 2 Double Sided 80 in the same case | **$1,950.00** |

**SPECIAL** Add $150 to any of the above systems if you want 'The Solution' with the system. This would not include Radio Shack Extended Basic.

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## DISK SYSTEM PRICES

Get The Cable **FREE**

TANDON 40 TRACK SINGLE SIDED SYSTEM DRIVE 0
Complete with Drive, case, power supply, controller and cable. **$540.00**
DUAL S4 (2 drives in same case) **$855.00**

TANDON 40 TRACK DOUBLE SIDED SYSTEM DRIVE 0
Complete with Drive, case, power supply, controller and cable. **$650.00**
DUAL D4 (2 drives in same case) **$1,075.00**

TANDON 80 TRACK SINGLE SIDED SYSTEM DRIVE 0
Complete with Drive, case, power supply, controller and cable. **$650.00**
DUAL S8 (2 drives in same case) **$1,075.00**

TANDON 80 TRACK DOUBLE SIDED SYSTEM DRIVE 0
Complete with Drive, case, power supply, controller and cable. **$775.00**
DUAL D8 (2 drives in same case) **$1,320.00**

## Disk Drives with Case

TANDON 40 TRACK SINGLE SIDED DRIVE
Complete with Drive, case and power supply, **$340.00**
DUAL S4 (2 drives in same case) **$655.00**

TANDON 40 TRACK DOUBLE SIDED DRIVE
Complete with Drive, case and power supply, **$450.00**
DUAL D4 (2 drives in same case) **$875.00**

TANDON 80 TRACK SINGLE SIDED DRIVE
Complete with Drive, case and power supply, **$450.00**
DUAL S8 (2 drives in same case) **$875.00**

TANDON 80 TRACK DOUBLE SIDED DRIVE
Complete with Drive, case and power supply, **$575.00**
DUAL D8 (2 drives in same case) **$1,120.00**

## TEAC HALF HEIGHT DRIVES

TEAC 40 TRACK DOUBLE SIDED SYSTEM WITH TWO DRIVES
Includes 2 40 track drives in a single case with power supply, controller and cable. **$975.00**
With 1 drive **$650.00**

TEAC 80 TRACK DOUBLE SIDED SYSTEM WITH TWO DRIVES
Includes 2 80 track drives in a single case with power supply, controller and cable. **$1,165.00**
With 1 drive **$750.00**

## COMPARISON CHART

This chart is different from other charts you might be used to seeing. Many companies will list the unformatted capacity of the drives. This is useless information because you lose about 25% of that when you format a disk. You can't use the disk without formatting it, so why not give the useful storage of the drive instead. This is what this chart gives you. Not only the useful number of bytes, but also the number of free sectors and bytes after the directory is assigned. You can use this chart to tell exactly how many bytes and sectors are actually available for your use. For comparison I have listed the Radio Shack drive in the same way. Remember that with Radio Shack DOS you can only have a maximum of 68 files on any disk. This is very wasteful. With FLEX the disk space is much more efficiently used.

| DRIVE SIZE | FORMATTED BYTES | USEFUL STORAGE | USEFUL SECTORS |
|---|---|---|---|
| RS35SS | 161,280 | 156,672 | 612 (68 GRANS) |
| 35SS | 156,744 | 154,224 | 612 |
| 40SS | 179,424 | 176,904 | 702 |
| 40DS | 358,848 | 353,808 | 1,404 |
| 80SS | 360,864 | 358,344 | 1,422 |
| 80DS | 721,728 | 716,688 | 2,844 |

35SS means 35 track single sided, 40DS means 40 track double sided etc. The reason that Radio Shack has more useful storage than a FLEX 35 track is because FLEX's standard is for track 0 to be single density. However the useful storage is almost the same because Radio Shack wastes a whole track for the directory. Also FLEX uses 4 bytes from each sector for linking and this is what makes the storage more efficient.

The next chart shows the total system capacity. This can be confusing because with double sided drives, you can only have a maximum of 3 drives. This is true even if only one drive is double sided.

| SYSTEM | USEFUL BYTES | USEFUL SECTORS |
|---|---|---|
| Radio Shack DOS | | |
| 4 35 track SS | 626,688 | 2,448 |
| FLEX DOS | | |
| 4 35 track SS | 616,896 | 2,448 |
| 4 40 track SS | 707,616 | 2,808 |
| 4 80 track SS | 1,433,376 | 5,688 |
| 3 40 track DS | 1,061,424 | 4,212 |
| 3 80 track DS | 2,150,064 | 8,532 |

As you can see, it is possible to get 3 1/2 times more storage with FLEX than with Radio Shack DOS. These capacities are true no matter what FLEX you have.

One final note on drives. The most common disk system for any FLEX system is 2 double sided 40 track drives. However let you storage needs and your pocketbook be your guide.

**Last minute note:** We received notice that Tandon Half height drives would be shipped to us in March. If this turns out to be true, we will have them in stock by the time you read this. Please call about price and availability.

FHL reserves the right to change pricing and product specifications at any time without further notice.

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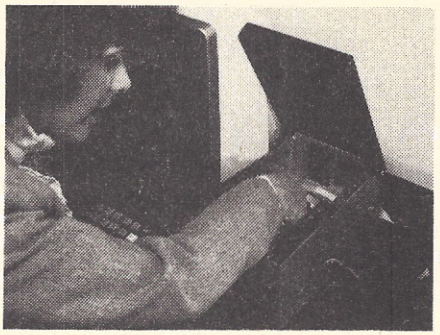
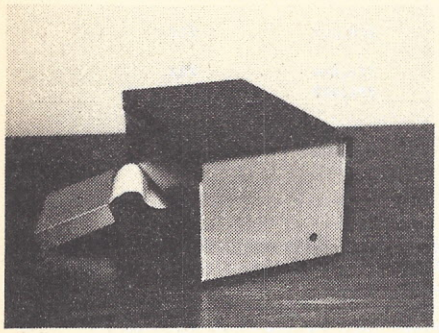
*1. Here is Jeri plugging The Solution into the CoCo. Then she will move the main case up close to the CoCo. The cable is kept short to prevent noise and interference. The disk controller can be plugged into the side slot. The power supply plugs into a socket on the back of the case. All wires for the internal boards exit out the back of the case.*

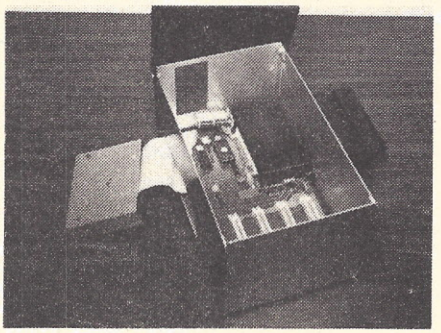


*2. Here Jeri is setting the dip switches in The Solution. The hinged top makes the job easy. The switches can be set for three different things. Up to four boards can be installed inside the case.*

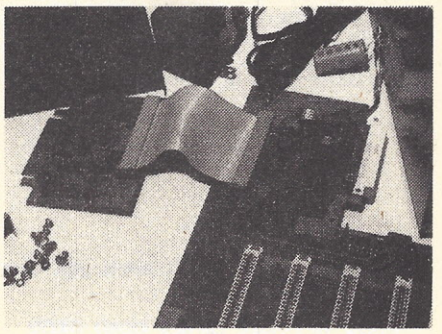
*3. Here is The Solution at work. It makes a very nice addition to your CoCo with a black anodized top and a silver anodized main case both made from heavy aluminum stock.*



*4. Here's The Solution all by itself. The heavy aluminum anodized case is a thing to be proud of. The buffer board can be seen to the left of the main case. The LED indicator on the front comes on when you turn on the power to your CoCo. The Solution needs no on/off switch.*



*5. All that's missing from this picture is the plug in the wall power supply. You can see the 4K EPROM monitor and the 4 position dip switch. At the front are four of the five expansion slots with a disk controller plugged into the fifth slot on the side. The power LED is at the lower right front of the case.*



*6. Here's the real guts to The Solution. We took it all apart so that you could look at the parts. The 1 amp power supply can be seen in this picture. All the connectors are gold as you would expect. The small board is the buffer board. The white connectors are the same as the CoCo's.*

# THE SOLUTION AND WHY WE BUILT IT

When we first introduced FLEX for the CoCo in February 1982 we received hundreds of calls from software and hardware developers who wanted to use the CoCo because it was so inexpensive compared to everything else on the market. However there is not enough expansion or I/O in the CoCo to make this possible for most of these users. I know that the CoCo is viable in most cases, but for many, there needed to be more. So that was the original reason for designing the expansion box we call "THE SOLUTION."

The motherboard has the 2K/4K EPROM socket with a 4K monitor EPROM in it. Also inside are 4 vertical connectors for internally mounted boards or ROM type cartridges. The fifth connector is horizontal and is made for the disk controller, ROM cartridges or additional expansion out the side the of The Solution. A four position dip switch allows for 3 options to be selected. One option will cause the CoCo to get its interrupt and reset vectors from the monitor instead of RS Basic.

If you choose to come up in the monitor, then it is not necessary to have RS Extended Basic in the CoCo to boot FLEX because the monitor has a built-in boot. This saves $100.00 of the cost of The Solution. The power supply is a plug-in-the-wall type with a connector in the back of the case. The back of the case is open and it is thru this that all the cables for the different cards go. This makes for a very neat appearance.

## TECHNICAL SPECIFICATIONS

*Bus Structure*...Fully buffered Color Computer compatible bus. Priority daisy chained arrangement where each slot has a priority assigned to it. The farther out on the bus that you are, the less priority you have. The disk slot (0) has the highest priority with slot 1, 2, 3, and then 4 has the lowest. The pinout and the timing is the same as the Color Computers with the exception of the sound line. This is used on the motherboard for the priority line.

*Power Supply*...The power supply is a tracking power supply which means that the Color Computer itself turns The Solution on and off so that there is no need for an on/off switch. A LED on the front of The Solution indicates when the entire system is on or off. The tracking power supply means that The Solution's bus voltage will be the same as the Color Computers to within a very few minnivolts. The power supply included with The Solution is a 1 amp supply for the 5 volt line only. The +12 and −12 voltages are taken from the Color Computer.

*Dip switch options*...

1) Select the 4K ROM monitor when this option is selected. The system will come up in the monitor and get interrupt vectors from it rather than the Radio Shack Basic ROM. The reason you might want to do this is so you can boot FLEX from the monitor rather than Basic. This will allow running FLEX without having Extended Color Basic in the CoCo. This also ties in with the option on the serial card to come up on a terminal instead of the CoCo TV set and keyboard.

2) Disable the disk slot (0). This will allow using ROM cartidges in The Solution without unplugging the disk card. When the switch is on, the ROM is active. When it is off, whatever ROM cartridge is there is active. This infers that you could switch back and forth between a cartridge and the disk system. This is NOT necessarily true because of the need to initialize the disk software in the ROM and this may destroy what is in memory. It may be possible under special circumstances to do this but it is up to the user to work it out.

3) Select either a 2K or a 4K EPROM. This is set for a 4K EPROM which is included with The Solution. However, it can be changed if you have a need. The EPROM is addressed at $E000.

4) User definable. This means that we didn't use this switch for anything, but you can if you want, or we could call it 'reserved for future expansion.' This means that we don't have any use for it now, but we may in the future.

The Solution I/O cards are addressed at either the $FF60-$FFBF area OR the $FE00-$FEFF area.

These prices and specs are subject to change without notice. Call for confirmation.

**THE SOLUTION** **$249.00**
(Price includes case and power supply.)

CARDS FOR **THE SOLUTION**

**DUAL SERIAL PORT** **$130.00**
Two 6551 ACIAs, programmable baud rates (110-19,200), full RS-232, DB-25 conn.

**CLOCK and PARALLEL PRINTER CARD** **$110.00**
OKI clock w/battery backup and 1 parallel output port

**PROTOTYPE Cards** **$ 37.00**
3½ by 9 inch card

**EPROM/RAM Card** **$ 90.00**
Up to 16K ROM (2732) or 8K static RAM (6116). Each device individually addressed anywhere in memory

**EPROM programmer** **$165.00**
Program 2K, 4K or 8K EPROMS. Software included either on disk or on board ROM.

**TRIPLE PARALLEL I/O Card** **$105.00**
Two 6821's and one 6522 for parallel I/O.

Note: We are considering several other cards for The Solution. Please let us know what you want, if there is enough interest, we will make it.

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# OS-9™, FLEX™, UNIFLEX™ SOFTWARE

**UNIFLEX SIMULATOR FOR FLEX**
**$100-FLEX $110- UNIFLEX**

This program enables the user to debug UNIFLEX assembler programs using the TSC DEBUG and other facilities of FLEX .

**FULL SCREEN FORMS DISPLAY (6809 XBASIC)**
**$50-FLEX $75-UNIFLEX**

These programs enable the user to define and generate table-driven full-screen display and data-entry programs.

**FULL SCREEN INVENTORY/MRP (6809 XBASIC)**
**$100-FLEX $150-UNIFLEX**

These programs enable the user to define and maintain inventories, and include hierarchial materials requirement planning.

**TSC BASIC/XPC UTILITY PROGRAMS all**
**$25-FLEX $50-UNIFLEX**

These programs enable the user to resequence or cross-reference any BASIC program and generate XPC Basic sort programs.

**SUPER SLEUTH DISASSEMBLER**
**$99-FLEX $100-UNIFLEX $101-OS-9**

This program processes 6800/1/2/3/5/8/9/6502 programs, enabling the user to analyze, modify, and disassemble (with labels) object code, with output to terminal, printer, and disk, and cross-reference and label-definition capabilities.

**Z-80/8080/5 SUPER SLEUTH DISASSEMBLER**
**$99-FLEX $100-UNIFLEX $101-OS/9**

This version of SUPER SLEUTH processes Z-80/8080/5 object code on the 6800/1/9.

**CROSS ASSEMBLERS**
**each $50 3/$100-FLEX each $60 5/$120-UNIFLEX**

These programs and TSC macros enable the user to process 6800/1, 6805, 6502, Z-80, 8080/5 programs in original format.

**6502-TO-6809 XLATOR SYSTEM**
**$75-FLEX $80-UNIFLEX $85-OS/9**

This program enables the user to translate 6502 assembler code into 6809 assembler code, noting inexact conversions.

**6800-6809 & 6809 PIC XLATORS**
**both $50-FLEX $60- UNIFLEX $75-OS/9**

These programs enable the user to translate 6800/1 assembler programs to 6809 mnemonics and to convert 6809 programs to position-independent code and data, using PC, S, U, X and Y as base registers.

**6805 and 6502 DEBUGGING SIMULATORS**
**each $75- FLEX $80-UNIFLEX $100-OS/9**

These programs enable the user to inter-actively analyze, modify, and debug [14] 6805 and 6502 object code.

Programs in source on disk-specify size, sides, density, type.
Detailed printed manuals provided with all products.

FLEX™, UNIFLEX™, and OS-9™ Technical Systems Consultants, Inc. and Microware.

REVISION 'E' PROCEDURES

1. Remove the following capacitors. C61, C31, C64, C35, C67, C45, C70, C48.

2. The ferrite bead will be installed in the R83 position (the two staking pins next to C44). Place the bead on the staking pin closest to R75 then place the smallest of the provided jumper plugs over both staging pins.

3. Set the jumper plug located just below C44 to the 16k/32k position.

4. Set the jumper between U8 and U4 to the 32k position.

5. Set each of the three plugs just above the keyboard connector to the 32k position. Make sure there is no power on the computer when you do this or damage may occur.

4. Note the position of notches on top of U20-U27. Remove and install 64K chips in their places.

5. The other jumper plug is to be placed on the staking pins next to U29 in either position. DONE.

REVISION 'F' PROCEDURES

1. Remove these capacitors, C58, C60, C62, C64, C66, C68, C70, C72.

2. Install jumper to the left of U17 marked 64K.

3. Move the 3 jumpers from the 16k position to the 64k position.

4. Note the position of notches on top of U21-U28. Remove and install 64K chips in their places. DONE.

NOTE: Revision F is now 64kl No futher mods need to be done.

**Reprinted from November 1982 Color Computer News**

64K KORNER

**QUESTIONS**

By Frank Hogg

**Telewriter and FLEX**

Normally a machine language program like Telewriter would not work with FLEX because of the differences between the two systems(see the discussion on this later) However, I received a call from one of our users who told me he was using Telewriter with FLEX. Several people have asked me about Telewriter and FLEX, so I was very interested in how he did it.

It turns out that Telewriter uses a Basic program to save the text to disk using the SAVEM command. D/BASIC, which is Radio Shack DISK BASIC running under FLEX, supports both SAVEM and LOADM, as well as CLOADM and CSAVEM, plus others.

What he did was this. First CSAVEM Telewriter to tape from Radio Shack BASIC, then load FLEX and get into D/BASIC. CLOADM Telewriter from tape and SAVEM to FLEX disk. You would have to use a similar process to transfer text files to FLEX disk if they could not transfer with the program that comes with D/BASIC. As I do not have a copy of Telewriter, I cannot confirm this, but I have an order in for a copy and I will give you a report next month.

This brings up a point about the differences between Radio Shack disks and FLEX disks.

There are two differences between FLEX and Radio Shack DOS when it comes to machine language programs. First is the way the data are stored on disk with the two systems. In Radio Shack DOS the data are stored in granules of 9 sectors each. In FLEX the data are stored by sectors. Second is the way each system keeps track of where in memory a machine language program will load.

A machine language program in Radio Shack DOS is flagged as such in the directory. The file itself begins with a 5 byte header;

Byte 1 = Flag
Byte 2 & 3 = size of this segment
Byte 4 & 5 = starting address

At the end of the segment is another 5 bytes;

Byte 1 = Flag
Byte 2 & 3 = size of next segment
Byte 4 & 5 = starting address

If the size of the next segment is 0 then bytes 4 & 5 become the transfer address or starting address for the program.

A machine language program in FLEX is stored quite differently. If the first byte of a file starts with a $02 then it is a machine language file. A machine language file has a 4 byte header;

Byte 1 = Flag ($02)
Byte 2 & 3 = starting address
Byte 4 = length of this segment

If the byte after the last byte is a zero, loading stops, If however that byte is a $16 then the following two bytes are the transfer address. If the next byte is a $02 loading continues until a 0 after the last data byte is read. In this way multiple transfer addresses can be in a file; however, only the last one will be used.

The two systems are different to the point that a direct byte for byte copy will not work. The program to do this would have to read the file and translate the information into the other systems style and then save it to the disk. DBASIC will read a cassette tape and write to FLEX disk. In like manner DBASIC will read a FLEX disk and save to Radio Shack tape, so transfers can be made between the two systems in this way.

We are working on programs to do this but at the moment DBASIC is the only way.

CBASIC is one of the utilities included with FLEX that will also read a Radio Shack tape. CBASIC does not have any way to save to the disk itself but if you knew where the program you read in was in memory you could get back into FLEX and save that area to FLEX disk with the SAVE.CMD of FLEX. Running the program later would involve going into CBASIC, going back to FLEX and doing a GET of the program saved and then jumping to the starting address of the program with the JUMP.CMD of FLEX.

**USING AN EXTERNAL TERMINAL**

The new version of FHL Color FLEX has a command called EXT. This is how you can use it to run an external terminal and printer with FLEX.

EXT will allow a standard serial terminal such as a TVI 910, to be hooked to the RS232 port of the Radio Shack Color Computer. Additionally, a printer may be hooked to the terminal.

This utility will control the capability built into the terminal that turns the terminals printer port on and off.

This will appear to the calling program as a normal terminal/printer combination. The terminal used is a TeleVideo 910 and the printer is a Microline 82a with a high speed serial interface. Other combinations may be workable, but it is left to the user to implement them.

**HOW IT WORKS**

The Radio Shack RS232 port is a bit banger type of port, that is to say that each character sent out this port must be sent a bit at a time by software. There are some limitations to this type of port. Because of the way the hardware is in the color computer it was not possible for us to do any hardware handshaking. This means that if the terminal or the printer is busy (not able to accept any more characters), then the CC will not be aware of this and will continue to send them, resulting in lost characters. This will probably not happen with the terminal but it is a problem with the printer.

In the case of the TVI 910, the baud rate of the printer port must be the same as the terminal. With the high speed serial interface in the 82a the highest rate is 9600 baud. If we set the 910 to 9600 baud and the 82a to 9600 baud it should work fine.

However there is a catch. When the printer buffer (2048 chacters) fills up we start to lose characters. The printer is able to Receive characters at 9600 baud but it only prints them at about 1200 baud. When it is hooked to the CC as a printer only it just stops the CC until it can receive more characters. But when it is hooked in the full duplex mode there is no way to tell when the printer is busy and you lose chacters.

There are three user changeable variables in EXT.

CDELAY Intercharacter delay
PBUFF # of characters to send before delay
CRNULL Number of nulls between CR and LF.

Characters are sent to the printer without any intercharacter delay (CDELAY) until the limit of PBUFF. Then CDELAY is invoked between all characters after that. PBUFF is set to zero when a character is sent to the terminal. CRNULL is the number nulls to send between a carriage return and a line feed.

In our case we are sending 1500 characters before any delay is used between characters. This gives us a margin of better than 500 characters in the buffer. After the 1500 are sent then the delay is used between characters to prevent the buffer from overflowing. We don't use any nulls between CR and LF so this is set to zero.

Whenever printing stops and FLEX goes back to the terminal the count is reset to zero on the number of characters sent before the delay.

When a character is sent to the printer EXT checks a flag to see where the last character went. If the last character was sent to the printer then EXT adds one to the count and checks to see if the count is more than the limit. If it is, then EXT waits for the amount of time determined by the delay and then sends the character to the printer. If the character is a CR then EXT sends whatever nulls were required by CRNULL. If the last character was sent to the terminal instead, then EXT first sends a string of up to 12 characters to the terminal. These characters will configure the terminal for transparent printer pass through and configure the printer if needed. Then the character is sent thru the terminal to the printer.

A similar thing happens for the terminal. EXT checks the flag to determine where the last character went and if it went to the terminal last then EXT just sends it. If however the last character went to the printer, then EXT sends up to 12 characters to the terminal to turn off the transparent printer passthrough mode and configure the terminal, (if necessary) before it sends the character to the terminal.

**INSTALATION**

The terminal is connected to the CC via the RS232 port (serial I/O) on the back of the CC. This is a four connector DIN connector numbered 1,2,3 and 4. This is connected via cable to a DB25 connector.

Pin 1 of the DIN goes to Pin 20 of the DB25
Pin 2 of the DIN goes to Pin 2 of the DB25
Pin 3 of the DIN goes to Pin 7 of the DB25
Pin 4 of the DIN goes to Pin 3 of the DB25

The Microline 82a printer is connected to the terminal via a cable with two DB25 connectors.

Pin 1 of the 82a DB25 goes to Pin 1 of the 910
Pin 3 of the 82a DB25 goes to Pin 3 of the 910
Pin 7 of the 82a DB25 goes to Pin 7 of the 910
Pin 11 of the 82a DB25 goes to Pin 8 of the 910

The baud rate of the TVI 910 and the 82a are both set to 9600 baud. The SETUP command is used to set FLEXs baud rate at 9600 baud also. ie: SETUP PB9600

Then the command EXT is executed and the '+++' will appear on the terminal. If you type 'P CAT 0' a catalog of drive 0 should appear on the printer and the prompt should appear back on the terminal after the catalog is done.

In order to halt the listing on either the printer or the terminal the BREAK key on the Color Computer KEYBOARD is used, NOT the ESC key on the terminal.

□

**Reprinted from December 1982 Color Computer News**

64K KORNER

BBSs - 64K & ROM

By Frank Hogg

Here is a discussion on using high RAM as display memory. It comes to us from Kent Meyers who got it from one of the BBS's that he has been contacting. I haven't tried it yet but here it is for your use.

**Using 64K CC w/ROM BASAC**

Author unknown

With the 64K mod installed and running BASIC in ROM, the upper 32K is available for display memory. This would give you an additional five 6K HI-RES graphics pages, 63 pages of text, etc. This area could be used to hide pictures, menus, "HELP" screens and free up most of low memory for program storage. The uploading of this material to the high memory could be done by a slight variation of the routine used to upload the BASIC ROMS. The program that follows illustrates one method of changing display pages from BASIC. It uses six bytes of machine code and two BASIC statements to set the address offset in the SAM, allowing the user to get the base address of the display through high memory from $8000 to $FE00. Lines 20-40 can be used in any BASIC program to POKE machine code without converting to decimal. It is nothing original, but I would like to see it widely used. I hate having to convert someone else's decimal POKES to HEX in order to see what they're trying to do or to check for typos. Line 60 POKEs the desired offset into the second byte of an LDA# instruction and EXECs the machine language program:

```
                ORG     $7FFA
7FFA 86 00      LDA     #$00
7FFC 44         LSRA
7FFD 7E 96 0F   JMP     $960F
```

The program then waits for a keypress. If it is "E", it ends. Otherwise, you see the next page. Before it quits, it EXECs $95AC to restore the normal screen. Load BASIC into RAM and reset the CC to get back into ROM before running the program.

To keep Extended BASIC from returning to the normal text screen after entering graphics commands from the keyboard, do POKE &H167 ,&H39. Try SCREEN ,1. To get the normal screen back, do SCREEN 0. To restore to normal operation, POKE &H167 ,&H7E.

The display changing program follows...

```
 5 ' PAGE THRU UPPER 32K
10 CLEAR 200, &H7FF9:H$="&H"
15 READ A$,B$
20 FOR A=VAL(H$+A$) TO VAL(H$+B$)
25   READ A$:POKE A, VAL(H$+A$)
30 NEXT A
35 FOR A=&H80 TO &HFE STEP 2
40   POKE &H7FFB, A: EXEC &H7FFA
45   A$=INKEY$
50   IF A$="" THEN 45
     ELSE IF A$="E" THEN 60
55 NEXT A
60 EXEC &H95AC:END
65 DATA 7FFA,7FFF
70 DATA 86,00
75 DATA 44
80 DATA 7E,96,0F
```

**END**

This is a good example of the interesting things that you can get from the BBS's. Here, also from Kent, is a list of several BBS's that cater to the CoCo and the 6809.

COCO BBS's

212-441-3755 Bob Rosen Woodhaven NY on a III
212-441-3766 " " " on a CoCo
512-285-5028 Peter Banz Elgin TX on a III
404-378-4410 Lee Blitch in Alanta GA on CoCo
(NOTE 6PM/6AM EDT)
312-260-0640 Terry Haas Wheaton IL on a III
408-733-6809 Shawn Jipp Sunnyvale CA on CoCo

68XX BBS's NON-CoCo

404-633-9761 Randy Jarrett and Chris DeCastro, Alanta GA. Written in XBASIC for SWTPC FLEX9.

405-722-6809 Rodger Walton and R. L. Hilbun in Okla. City, OK. FLEX like system, great HELP files, binary file up & download.

312-397-8308 George Dorner and Troy Monaghen in Palatine, Il. OS-9 Users Group, runs on a Hewlett-Packard Mini.

Thanks Kent for the information, I'm sure that many will get good use from it.

**FLEX or OS9 or FLEX or OS9 or FLEX**

Which way to go?

So now you've got 64K and it seems the only way to really use it is to buy FLEX or OS9. What do you do? This is one of the most frequently asked questions from our customers. The answer is easier than you might think.

If you want to work with a newer system, and you do not need prepackaged software, in other words, you're a pioneer, then OS9 is the system for you.

However, if you want a system that has a tremendous amount of support, a very large base of existing software, hundreds of prepackaged software, then FLEX is the answer. Also, FLEX software usually costs about HALF as much as the equivalent OS9 software. Also, there are two licensed versions of FLEX for the CoCo,(FHL and Spectral) and one overlay system (DC). The reason FLEX is so popular is that it was there first with OS9 coming several years later. OS9 is probably more powerful than FLEX, but without the support that FLEX has, OS9 falls short. Lastly, FLEX has several thousand CoCo users in the year it has been on the market and OS9 is yet to come.

**FRIENDLY FLEX**

Many users of the CoCo are used to programs that prompt you for each item that is needed. For example, if you were using an assembler, you might see something like this:

```
FILENAME TO ASSEMBLE ?
DO YOU WISH TO CREATE A BINARY FILE ?
```

and so on. The thing here is that you have to answer everything the program needs to run. This is fine for programs that you only run once in awhile, but what about a program you use every day? In FLEX there is a thing referred to as the command line. This refers to the instructions that you type in to FLEX at the '+++' prompt, on the 'command line'. This line can be up to 128 characters long. Let's use the example of assembling a program called TEST.TXT on the disk. In this first assembly, we don't want to create a binary file because we just want to test for syntax errors, and we don't want a listing or symbol table either. The command line would look like this:

```
+++ASM TEST +BLS
```

This is what happens. First, FLEX gets the file ASM from the disk and executes it. ASM looks on the command line of FLEX and gets the file TEST from the disk to assemble. Also, ASM gets the options (the +BLS) which tells ASM not to create a binary file (+B), or list the file (L) or provide a symbol table (S).

We will assume that the program TEST did not have any bugs. Now we can create the binary file and at the same time send a listing with line numbers to the printer, and we want to name the binary file TEST1.CMD. This is how that would look:

```
+++P,ASM,TEST,TEST1.CMD,+N
```

This is what happens. The 'P' in the front of the line tells FLEX to divert output of this command to the printer. (this works with ANY FLEX command) ASM and TEST are the same as before, but the TEST1.CMD tells ASM to create the binary file with that name. The '+N' tells ASM to put line numbers in the output lines. Finally you may be wondering why in this example there are commas, and in the last example there were spaces. FLEX treats both the same. It doesn't matter whether you use spaces or commas. As a matter of fact, the line could have looked like this:

```
+++       P,ASM          TEST    TEST1.CMD,      +N
```

and it would have worked just as well!

FLEX is just that, FLEXible. By doing everything on the command line, you can save a lot of time.
Other things that you can do on the command line include:

```
+++P ASM TEST +BLS:ED TEST
```

In this case we just know that there are going to be errors, and a lot of them. The first part of the line is the same as the first example above, but the error messages will go to the printer. The ':' is a separater just like in BASIC. After the assembly is done, FLEX will call the ED editor and be ready for you to edit the file TEST when you return from the john or wherever.

You can put as many commands on the line that will fit within 128 characters. Suppose you wanted more? What do you do?

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TELEX 646740 · (315) 474-7856

## COLOR COMPUTER PRICES

| | |
|---|---|
| 64K TRS-80 Color Computer, with extended BASIC and our modification to access the other half of the 64K chips. These are good 64K chips, not from Radio Shack | $599.00 * |
| Radio Shack TRS-80 Color Computer Disk Controller Card in a metal case with the manual | $200.00 * |
| FLEX ready to run ---------- | $ 99.00 * |

### DRIVES IN CASES WITH POWER SUPPLY

| | |
|---|---|
| Single sided, double density 40 track ---------- | |
| Two of the above in a single case ---------- | |
| Double sided, double density 40 track ---------- | $450.00 |
| Two of the above in a single case ---------- | $875.00 |
| Two Drive cable ---------- | $ 25.00 * |
| Three Drive cable ---------- | $ 30.00 |
| Four Drive cable ---------- | $ 35.00 |

Complete systems:

1 SSDD drive, 64K RAM, 24K ROM and FLEX $1,195.00

An '*' beside the price shows what this includes.

As above but with 'THE SOLUTION' and no Extended Basic

### BARE DRIVES (no case or power supply)

SSDD ---------- $240.00
DSDD ---------- $382.50

NOTE----

The 64K computer we sell is a 32K color computer with good 64K chips and Radio Shack extended basic. It is modified as per our article to use the entire 64K. The modification does NOT affect normal operation of the Color Computer.

The Radio Shack disk controller cannot normally be purchased separately. We buy the board as a replacement part and put a metal case with it.

The drives that Radio Shack sells with their systems have had a high failure rate. Because of this we are selling either Tandon or MPI drives. Both of these have a good history.

DID YOU KNOW?

That the Radio Shack 8K Disk ROM only uses 6K? Wonder what they are going to do with the other 2K?

DID YOU KNOW?

That by using 'The Solution' and buying very carefully, you can get a disk based 64K color computer and FHL FLEX for less than $1000?

DID YOU KNOW?

That with 'The Solution', and a terminal, ALL FLEX software runs without modification? At least no more than any standard FLEX system.

DID YOU KNOW?

That with FHL Color FLEX, the CoCo is the most cost effective 6809 computer there is, no matter what use you have for it?

DID YOU KNOW?

That we couldn't find anything to put here?

## RECOMMENDATIONS for new users

What do you need to run this or that program? That is one of the most asked questions for new users of the FLEX operating system. First let me give you some background and comparisons between what you might be used to and what you are buying. When you bought your CoCo it came with Color Basic. You then added Extended Basic for $100. After that came Disk Basic along with the disk system. Disk Basic has some disk I/O added to it to allow the use of disk files instead of cassette files. Keep in mind here that the disk I/O was added to the basic, not the other way around!

FLEX is an operating system and not a language. Basic is a language with disk I/O added to it, not a real operating system. You cannot program in FLEX because it is not a language. But you can purchase several different languages that you can program in that all run under the FLEX system, you're not stuck with Basic only.

So why FLEX if it doesn't have Basic with it? Well if you are happy with what the RS Basic system provides in the way of usability and variety of software, then FLEX isn't for you. FLEX opens a lot of doors to high quality software. It's like the wheel on your car, you don't get any mileage out of it, it doesn't help you get traction in the winter snow, but you have to have it to put the tires on or you wouldn't go anywhere.

A good operating system is the fulcrum that all your software pivots on, if it isn't good then everything else is wasted.

So, lets get down to brass tacks, just what do you need to get it up and running? First you need a 64K CoCo, either a modified D or E version or the new F version that is 64K. Then you need Extended basic and at least the drive 0 disk system. Last, but not least, you need FHL Color FLEX from us.

Now put the disk in the drive and type RUN"FLEX and you're up and running in the most popular operating for the 6809 in the world! .... So What Now! Can you run Basic programs..... NO! You have to have something in there to run under FLEX to do these other things.

What catagory do you fit into?

ASSEMBLY LANGUAGE: For this you need a good Editor and Assembler, I recommend our ED/ASM package at $100 as being the best buy for FLEX. The editor is line orientated with screen editing within the line. It also has MACROS and a math package built in. Of course it has all the standard editing features. The assembler is a powerful conditional MACRO assembler. It has more features than any other in its price range.

BASIC PROGRAMMING: For this you will need a version of basic. There are several to choose from. First is DBASIC, Radio Shack Disk Basic reading and writing to FLEX disks. It supports just about all the standard RSD Basic functions with the exception of direct access files. It also includes a RS to FLEX copy utility. Second is TSC BASIC and XBASIC. TSC BASIC is speedy and good for light duty things. XBASIC is a full Basic with 16 digit precision and ON ERROR, plus much more. If you plan to run business or scientific software then XBASIC is the choice. It is used by more than 90% of all FLEX basic programs. You can use any editor to create programs for any Basic for FLEX. For that matter, any editor can be used to create programs for any language in the FLEX system, except XFORTH, (it has its own). DBASIC is $30 w/FLEX, TSC BASIC is $65, and XBASIC is $100.

For just using FLEX to run some canned software that we sell, look in the catalog. It tells what is needed to run each program.

So there you have it, plan your purchases wisely for you can drop a bundle if you are not careful. It is our desire to see that you have software that solves your problems, not create more problems. We do not wish to sell you something that you cannot use. If you have a question then it is wise to call and talk to someone before you order.

### Return and Refund Policy

If you bought something and want to return it, there are several conditions that must be met. First absolutely NO software is returnable if the plastic package around the disk has been opened. Refunds will be made only if you receive authorization from us to return the package and only if the package is in a salable condition. Manuals that are bought for evaluation are NOT returnable but the cost is deductible if you purchase the package the manual is for. Under no conditions is the shipping and handling refundable.

### Software Updates

With few exceptions, all of our software has this update policy. The software will be updated free for 90 days from purchase if the original disk with proof of purchase is returned along with $2.50 for shipping and handling. After 90 days the charge is $10.00. This does not include new manuals and may not include update sheets to old manuals. Check if there is a question. If the new program costs more than the program you bought then the update price of $10.00 must be added to the difference between the old and the new. If the new price is less than the old then there is no credit given and the $10.00 charge applies. If a new manual is involved then that cost is added also.

Ship disks back with one piece of corrugated cardboard on each side of the disk and put this in a manila envelope. If the disk is damaged on arrival then you will be charged an additional $5.00 for a new disk.

This service is provided at cost, please do not abuse it.

Note: I hope I haven't scared you off with all this but I wanted to be up front with you about our policies. We are convinced that the road to success in this business is to produce a quality product at reasonable cost, service our customers with software they can use, and charge enough to be able to pay for the above. In less than 3 years we have grown to the largest supplier of software for the 6809 in the world. I think we found the secret and we are going to keep it up.

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## EXEC

EXEC is one of the FLEX commands. It is unlike EXEC in RS BASIC. EXEC will take a text file as input, instead of commands from the keyboard. If you need to do a very complex task or are doing something very often, then you should create a text file that you can EXEC when you need to do this task. For example, you want to create a new system disk for FLEX. You first create a text file with the BUILD command or an Editor like ED. The file would look like this:

```
NEWDISK,1
PUTBOOT.LDR,1
COPY,0,1
LINK,1.FLEX.SYS
```

We will call the file MAKEFLEX. Whenever you wanted to make a new system disk all you need to do is:

```
+++EXEC,MAKEDISK
```

The first line formats the disk, then the boot is installed in the second line. The third line copies all the files from drive 0 to drive 1 and the last line links the boot to the FLEX system file on the new disk.

This last item, the linking of FLEX, needs some explanation. The file FLEX.SYS can reside anywhere on the disk and it can be named anything! Also, you can link the boot to something besides FLEX. You can use the boot to run a program of your own besides FLEX, I won't go into the ramifications of that, but suffice it to say that it is possible. The linking process tells the boot where to find FLEX on the disk.

In future columns I will touch on some of the tricks that you can do with FLEX. But as always, I need your help. I need to know what areas you would like to see covered. Several people have called or sent in things for me to go over and this is the type of thing that keeps this column alive. I thank all of you who have helped.

See ya next month.

Frank

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These articles are reprints from a column that I write for Color Computer News every month. The address of CCN and other magazines that we advertise in are listed below.

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October '82 **RAINBOW**: A comparison of FHL Color FLEX to 68 Micro Journal's (Data-Comp) FLEX, p. 64.

February '83 **80 MICRO**: Read the review of our DBASIC for FHL Color FLEX!

March '83 **80 MICRO**: FHL Color FLEX will be the feature review!!

□

DID YOU KNOW?

That Radio Shack's 16K CoCo has jumpers inside that say 16K/64k? Yes, it means that RS will soon debut a 64K CoCo. My guess is that they will announce it in January, but like the Model 16, without software. The Operating system will be promised soon, but will be delivered in June. The price will be $499.95 or $599.95 to compete with the Commadore 64K that sells for $595.00. Oh by the way, it runs FHL Color FLEX with no problem. After all they copied our modification didn't they? Who says RS doesn't move fast, it took less than a year!

DID YOU KNOW?

That ccFORTH compiles off disk at an rate of about 250 lines of source every one and a half seconds? Thats almost as fast as the disk can read! There is no faster FORTH available for any computer!

## 64K KOLUMN

by Frank Hogg

### DISK SYSTEMS

Before we get into the discussion on the different disk systems for the Color Computer, I would like to answer some of the questions that have come up about the 64K upgrade and FLEX for the Color Computer in general.

There are four versions of the Color Computer. They are B, C, D, and E. Version B and C have been around for awhile now and because of the amount of work involved, I think it might be better to have Radio Shack or one of the companies that do this type of work do the 64K upgrade for you. Radio Shack instructs its service centers to replace these boards. One of these companies, 'Computer Plus' 800-343-8124, advertises in this magazine. Another company, Level IV of Livonia, Michigan, 313-525-6200 also does this work. The D and E boards are quite different and easy to upgrade. The chips used are 4164's and you'll need 8 of them. Both of the above companies will do the mod and/or sell you the chips with instructions. If you don't feel secure in doing the modification yourself, by all means have them do it for you. If you have the D boards, you'll need the 1.1 ROM. THE E board has it already.

I would like to clear up some confusion about the 32K that Radio Shack talks about and the 32K that other companies have. Radio Shack uses 1/2 of a 64K chip for its 32K, while other companies use piggyback 16K's to achieve the 32K. The 1.0 ROM initalizes the SAM for the 16K 4164's, Half good 64K chips and good 64K chips have the SAM initialized the same way. Therefore, the TYPE of chips you have to achieve the 32K will determine whether you need the 1.0 or 1.1 ROM. I don't think that the 1.0 ROM will work with 4164's, but I'm not sure as I haven't tried it.

FLEX is brought up on the system by just typing RUN"FLEX". This loads in a small BASIC program which in turn loads in a machine language program. The machine language program then switches the computer to map type 1, which is 64K RAM and no ROM. It then loads in FLEX from the same disk. FLEX comes up with its date request, and after you tell it the date the familiar '+++' prompt is displayed. The FLEX boot is on the same disk as FLEX, but they co-exist because of the fact that Radio Shack DOS has its directory on track 17, and FLEX has its directory on track 0. The links in the two systems point around each other, so there is no conflict. This is just on a disk that you would use to boot. Once in FLEX, you can use an all FLEX disk. Because FLEX resides in RAM, you have to boot FLEX whenever you turn the computer on.

The first question involves FLEX on the Color Computer.

Is the version we sell a 'standard' FLEX, and what FLEX software has to be modified to run on Color Computer FLEX?

This is a relatively straightforward pure version of FLEX. Most software that runs under FLEX now, will run under the Color Computer FLEX that we sell. We've even included such things in the console I/O drivers as cursor addressing, cursor up, down right, left, etc., plus some additional things in order to make it even more compatible with the typical FLEX system. There are some things that are different. The screen size, which is only 24X51, makes it a little difficult to use software that was designed for a 24X80 screen. Several companies that create FLEX software are modifying their software that requires the larger screen to run on the Color Computer FLEX system. We have included within the console I/O drivers the capability to echo the output that would normally go to the screen to go to both the screen and the printer. Typing a control 'P' will toggle the printer on and off. This will allow using the printer as a hard copy terminal. It is a very handy tool for other uses, too. It will enhance many utilities that display a screen full of information by putting it on the printer.

We are using a 'software' keyboard rather than a hardware keyboard. We poll the keyboard for 'get a key' rather than read a register in an ACIA as in many standard FLEX systems. The modifications that have to be made to a program to use a parallel keyboard are the same modifications that would be made for the Color Computer. These are documented with those programs that access the keyboard directly, so there's no problem there.

The third area is the use of interrupts. Very few FLEX programs use interrupts at all, but those that do will have to be changed to use the Color Computer. The interrupt vectors are in low memory in the Color Computer. Because this is user memory, we have not implemented printer spooling in this version of FLEX, but it may be done in the future.

Other than these minor differences, the system is a straightforward standard FLEX system. Software created on Color Computer FLEX will work on other FLEX systems and vice versa. The disks are compatible also.

How do you tell if a particular piece of software will work with Color Computer FLEX?

Most software packages will state if there are some special considerations such as those outlined above. Most software houses (ours included) try to stay away from problems and therefore do not produce non-standard software. The small screen size is a problem with software that uses menus or displays. There should be few problems in general. Over the next months, we will be checking out what programs will not work and how to correct them. However, there are several hundred software packages that run under FLEX and most of them will work as is. It's going to take some time to check them all out.

As you can see, what we have is a very 'standard' FLEX. All FLEX compatible software will run on your $1K Color Computer, just like it does on the $6K GIMIX, Smoke Signal, or SWTPC machines. As a matter of fact, you can run FLEX just like them, plus you can run OS-9 too (only GIMIX can do both). You can also run Radio Shack DOS and nobody else can do all three but the Color Computer. The Color Computer with FLEX and/or OS-9 is one verrrrry impressive machine.

What is the best disk drive to buy?

The Radio Shack disk controller has a 8K ROM on the card. The Radio Shack DOS (such as is) is in this ROM. Because this controller can be purchased for less than $200 (and that includes the 8K ROM), it is clearly the system of choice. It gives you the standard Radio Shack capability and in addition is the one we're supporting for FLEX and OS-9. The Radio Shack controller will support as much as 3 million bytes of unformatted disk storage. We are not bringing FLEX or OS-9 up on the Exatron controller.

It is NOT necessary to buy drive 0 from Radio Shack and, as a matter of fact, it is probably a better idea to buy a different brand such as MPI, Tandon, Shugart, etc. I think that the best choice for the Color Computer is to have two double sided, double density, 40 track drives, like Tandons or MPI B52's. Radio Shack will only write on one side and only 35 tracks of the double sided 40 track drive, but for FLEX and OS-9 you can use both sides and 40 tracks---the best of both worlds. When Radio Shack comes out with software for the disk, it will work fine with these drives.

## DISK OPERATING SYSTEMS

Now to the question of the disk systems themselves and how they compare. We're going to look at Radio Shack DOS and FLEX.

In order to compare them, we first must talk a little about what they are. I don't want to go into the higher level uses of the disk systems, but rather the nuts and bolts, just to get a general understanding about what these systems are.

The Radio Shack system is fairly simple. The disk is one sided, double density and is divided into 35 tracks, with one track set aside for the directory. The remaining 34 tracks are divided into granules, with 2 granules per track for a total of 68. Each granule has 9 sectors, each sector composed of 256 bytes, for a total of 2304 bytes per granule. On the directory track, which is only partially used, are enough entries for 68 files, plus an allocation map of the sectors on the disk. As the smallest file is 1 granule, 68 entries are all you'll ever need.

When you save a file on the disk, the name is put in the directory. The allocation map, also on the directory track, is checked to find the nearest available granule. The data is then put on the disk wherever there is room. Finally, the allocation table is rewritten to reflect the new information. When you delete a file from the disk, the allocation table is updated to show that granule is now available.

The smallest file you can store on a disk is one granule or 9 sectors long. If you save 1 byte on the disk, you would use all of those 9 sectors. The disadvantages are obvious. It is a waste of disk space and limiting as to the number of files you can put on the disk.

## USING THE DOS

The DOS is very basic in the system calls available to assembly language programmers. There is just one call to the DOS to read or write a single sector from the specified drive into a particular memory area. This call will return an error code that you can check. You can also perform a restore to track 0. There is NO support in the documentation about those routines in the ROM to do things like access the directory,update the allocation table, check for a filespec already in the directory or any of the other useful routines that must be in the ROM.

The other disadvantage to this system is that it is designed around a 35 track single sided, double density disk. That is the only system that works. It will not use the other 5 tracks of a 40 track drive, nor will it use the other side of double sided drives. They will work fine on the system, but it will only use the same amount of space it uses on the 35 track drive. Even if you wanted to use something else, it would not let you. Of course, you could change what's in the ROM, but that would be quite a task.

Now on the the FLEX operating system and how FLEX handles the disk. FLEX is a full DOS, a real disk operating system with great documentation.

Many think that with the Radio Shack system they have a disk operating system. Well, it is if all you want to do is store and retrieve data and files to and from the disk. But disk operating systems can be much more than that, much more elaborate and useful to the programmer and user than just those basic functions. Actually, the Radio Shack DOS is really just an extension of the BASIC with some functions for saving and loading to the disk, not much more complicated than those for tape. It also has a few utilities like copy and backup.

What does FLEX do that is so much better and so much different?

Let's examine first what a FLEX disk is made up of.

There is no standard number of tracks or sectors on a FLEX disk. It really doesn't matter to FLEX. The first 5 sectors of track 0 on all FLEX disks are the only standard portion of the disk. It is always single density. It can be double sided or single sided. The first two sectors are the boot sectors that are read in by a program in ROM by the traditional FLEX system. In Color Computer FLEX, we have the boot in the Radio Shack portion of the disk. Sector three is the 'System information record', or SIR. Stored here is information about the configuration of this particular disk. FLEX can look at the SIR and determine the size, number of tracks, sectors per track, and the total number of sectors on the disk. The name and the date that the disk was initialized and pointers to the beginning and end of the chain of free sectors are stored here.

Sector 5 is the first sector of the directory. The directory is a linked list that initially takes up the rest of track 0, but will grow beyond that when necessary. As more files are added, sectors are taken from the free chain and added to the directory. In the beginning, track 0 from sector 5 to the end of track 0 is set aside for the directory. On a single sided disk, this would allow for 5 sectors at 10 entries each or 50 entries. On a double sided disk, you would start with 15 sectors or 150 entries before sectors would be taken from the free chain. Remember that FLEX will enlarge the directory as needed.

The rest of the disk is formatted as a linked list where each sector points to the next sector in the list. This is called the free chain. When space is needed on the disk for whatever reason, FLEX takes the sectors it needs from the free chain for the file. The directory entry reflects where on the disk the file is and how many sectors it uses. There is no limitation the size of a file. It may be as small as 1 sector or as large as the entire disk.

All files except random access files are stored on the disk in the same way. Text files are stored with a space compression feature invisible to the user. With space compression, 2 spaces and over are stored as a $09,n where n is the number of spaces. This saves quite a lot of dick space.

It is a little more interesting when you deal with random access files, normally there would be no way for the system to know where a particular record (sector) is on the disk without looking thru the entire file. This is because during the course of saving ad deleting files from the disk the free chain will become fragmented over the entire disk. FLEX knows where the beginning and end of a file is, but how does it know where individual records are? FLEX takes care of this by adding 2 sectors to the beginning of every random file. These two sectors have a list of all of the sectors that are in a particular file and where they are on the disk. Therefore, any random access can be achieved by a maximum of two disk reads, on the the table in front of the file and then to the actual data sector itself. In practical use with several business programs that we have, random access is usually done in a second or two.

FLEX not only maintains the date the disk was created by the date that each file was created. This is useful in determining what file is the newest of several you might have.

There are other things about the disk structure itself that make it worthwhile to consider, but the primary thing about a FLEX system is that it can support any type of disk format. There is not limitation in the software itself. You can have a single sided 35 track drive on drive 0, a double sided 40 track drive on 1 and a double sided 80 track drive on 3. FLEX is able to handle all types with total aplomb.

What about documentation and access to the operating system?

Last month in the April issue of CCN, Dale Puckett had an excellent article on the features of FLEX and the ease of use of the operating system. I don't want to waste space repeating it, but just let me say that FLEX overcomes all the shortcomings that are apparent in the Radio Shack DOS.

□

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```
0040 0217 812C              CMPA #','
                          ; yes, do another line reference
0041 0219 27F6              BEQ GN1
                          ; no, continue scanning
0042 021B 9EA6            CONT  LDX PTR
0043 021D 20D2              BRA MARK

                          ; XREF reads a line number and
                          ; marks the refered line

0044 021F BDAF67          XREF  JSR GETNUM
0045 0222 A7E2              STA ,-S
                          ; search for line in program.
                          ; we can't use the BASIC ROM
                          ; routine because the link fields
                          ; are munged and it uses them
0046 0224 DC2B              LDD TEMP
0047 0226 9E19              LDX START
0048 0228 6D81            XRF1  TST ,X++

                          ; if the line doesn't exist
0049 022A 270F              BEQ BACK
0050 022C 10A381            CMPD ,X++
0051 022F 2706              BEQ XRF2
0052 0231 6D80            SKIPL TST ,X+
0053 0233 26FC              BNE SKIPL
0054 0235 20F1              BRA XRF1
                          ; mark the line
0055 0237 86FF            XRF2  LDA #$FF
0056 0239 A71C              STA -4,X
0057 023B 3582            BACK  PULS A,PC

                          ; PHASE 2:

                          ; This phase does the real work
                          ; of the program. REMs are
                          ; removed, spaces are removed,
                          ; and lines are crammed together
                          ; if possible,
0058 023D 9E19            DOIT  LDX START
0059 023F 1F13              TFR X,U
                          ; copy the line number and link
0060 0241 EC84            SAVLN LDD ,X
0061 0243 10270081          LBEQ ENDP
0062 0247 EDC1              STD ,U++
0063 0249 EC02              LDD 2,X
0064 024B EDC1              STD ,U++
0065 024D DF2B              STU TEMP
                          ; save the pointer to the start
                          ; of the new line
0066 024F                 EATIT
                          ; move past the line #
0067 024F 3003              LEAX 3,X
0068 0251 9FA6            STSTR STX PTR
                          ; get the next character,
                          ; skipping spaces
0069 0253 9D9F            STORE JSR NEXT
                          ; end of line?
```

# COLOR COMPUTER NEW!

## MACRO-80C

The Micro Works is pleased to announce the release of its **disk-based editor, macro assembler and monitor,** written for Color Computer by Andy Phelps. THIS IS IT — The ultimate programming tool!

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The screen-oriented text editor is designed for efficient and easy editing of assembly language programs. The "Help Key" feature makes it simple and fun to learn to use the editor. As the editor requires no line numbers, you can use the arrow keys to position the cursor anywhere in the file. MACRO-80C allows global changes and moving/copying blocks of text. You can edit lines of assembly source which are longer than 32 characters.

DCBUG is a machine language monitor which allows examining and altering of memory, setting break points, etc.

The editor, assembler and monitor — as well as sample programs — come on one Radio Shack compatible disk. Extensive documentation included. MACRO-80C **Price: $99.95**

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The Micro Works Software Development System (SDS80C) is a complete 6809 editor, assembler and monitor package contained in one Color Computer program pack! Vastly superior to RAM-based assemblers/editors, the SDS80C is non-volatile, meaning that if your application program bombs, it can't destroy your editor/assembler. Plus it leaves almost all of 16K or 32K RAM free for **your** program. Since all three programs, editor, assembler and monitor are co-resident, we eliminate tedious program loading when going back and forth from editing to assembly and debugging!

The powerful screen-oriented Editor features finds, changes, moves, copys and much more. All keys have convenient auto repeat (typamatic), and since no line numbers are required, the full width of the screen may be used to generate well commented code.

The Assembler features **all** of the following: complete 6809 instruction set; conditional assembly; local labels; assembly to cassette tape or to memory; listing to screen or printer; and mnemonic error codes instead of numbers.

The versatile monitor is tailored for debugging programs generated by the Assembler and Editor. It features examine/change of memory or registers, cassette load and save, breakpoints and more. **SDS80C Price: $89.95**

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```
0070 0255 4D                    TSTA
0071 0256 2730                  BEQ EOL
                        ; a comment?
0072 0258 9EA6                  LDX PTR
0073 025A EC84                  LDD ,X
0074 025C 10833A82              CMPD #$3A82     (REM)
0075 0260 275F                  BEQ SKIP
0076 0262 10833A83              CMPD #$3A83     (')
0077 0266 2759                  BEQ SKIP
                        ; save it
0078 0268 A7C0                  STA ,U+
                        ; start of a string constant?
0079 026A 8122                  CMPA #'"'
0080 026C 26E5                  BNE STORE
                        ; get pointer
0081 026E 9EA6                  LDX PTR
0082 0270 3001                  LEAX 1,X
                        ; copy the string
0083 0272 A680          MORES   LDA ,X+
                        ; is the trailing quote missing?
0084 0274 270A                  BEQ CRUNCH
0085 0276 A7C0                  STA ,U+
                        ; end of string?

0086 0278 8122                  CMPA #'"'
0087 027A 26F6                  BNE MORES
0088 027C 301F                  LEAX -1,X
0089 027E 20D1                  BRA STSTR
                        ; tack an extra '"' on
0090 0280 301F          CRUNCH  LEAX -1,X
0091 0282 9FA6                  STX PTR
0092 0284 8622                  LDA #'"'
0093 0286 A7C0                  STA ,U+
                        ; end of line processing
0094 0288 9EA6          EOL     LDX PTR
0095 028A 3001                  LEAX 1,X
                        ; end of program?
0096 028C A684                  LDA ,X
0097 028E 2738                  BEQ ENDP
                        ; is the next line marked and
                        ; therefore should be separate?
0098 0290 2B0D                  BMI ZAP
                        ; BASIC statement separator
0099 0292 863A                  LDA #':'
                        ; are we at the start of the line?
0100 0294 11932B                CMPU TEMP
                        ; yes, don't put ':' in
0101 0297 27B6                  BEQ EATIT
                        ; is there already a colon?
0102 0299 A15F                  CMPA -1,U
                        ; yes, don't put it in
0103 029B 27B2                  BEQ EATIT
                        ; no, put it in
0104 029D 201C                  BRA CONCAT
                        ; this is a real line
                        ; but is it empty?
0105 029F 11932B        ZAP     CMPU TEMP
```

```
0106 02A2 2608                  BNE ZAP2
                              ; yes, it's empty but is it needed?
0107 02A4 6D5C                  TST -4,U
0108 02A6 2B12                  BMI NOTQT
                              ; empty and unneeded; dump it
0109 02A8 335C                  LEAU -4,U
0110 02AA 2095                  BRA SAVLN
                              ; is there an extra '"' OR ':' at the
                              ; end of the last line that
                              ; can be tossed, since BASIC
                              ; does not need it?
0111 02AC A65F                ZAP2  LDA -1,U
0112 02AE 813A                      CMPA #':'
0113 02B0 2704                      BEQ STRIP
0114 02B2 8122                      CMPA #'"'
0115 02B4 2604                      BNE NOTQT
                              ; yep
0116 02B6 335F                STRIP LEAU -1,U
0117 02B8 20F2                      BRA ZAP2
0118 02BA 4F                  NOTQT CLRA
                              ; save the end-of-line or ':'
0119 02BB A7C0                CONCAT STA ,U+
0120 02BD 2782                      BEQ SAVLN
0121 02BF 208E                      BRA EATIT
                              ; skip a comment
0122 02C1 9D9F                SKIP  JSR NEXT
0123 02C3 4D                        TSTA
0124 02C4 26FB                      BNE SKIP

0125 02C6 20C0                      BRA EOL

                              ; end of program...  DONE!
                              ;  clear the last link
0126 02C8 6FC0                ENDP  CLR ,U+
0127 02CA 6FC0                      CLR ,U+
0128 02CC 6FC0                      CLR ,U+
0129 02CE DF1B                      STU ENDPRG
                              ; relink it so BASIC doesn't freak
0130 02D0 BDACEF                    JSR RELINK
                              ; clear the variables since
                              ; we moved the program
0131 02D3 7EAD26                    JMP CLEAR

0132 02D6                           END MUNCH
```

*COLOR COMPUTER NEWS TIP*

If you get and I/O ERROR during a load. Print the PEEK(129), if a 1 is returned then it was the tapes fault, if a 2 is returned it was a memory error.

Memory locations 136 and 137 point to the location of the cursor in memory.

Location 282 tells the computer if it is in lower case. If it contains 255 keyboard it is in upper case. If it contains a 0 it is in lower case.

Locations 52 and 53 contain the address in memory of the next DATA byte for a READ command.

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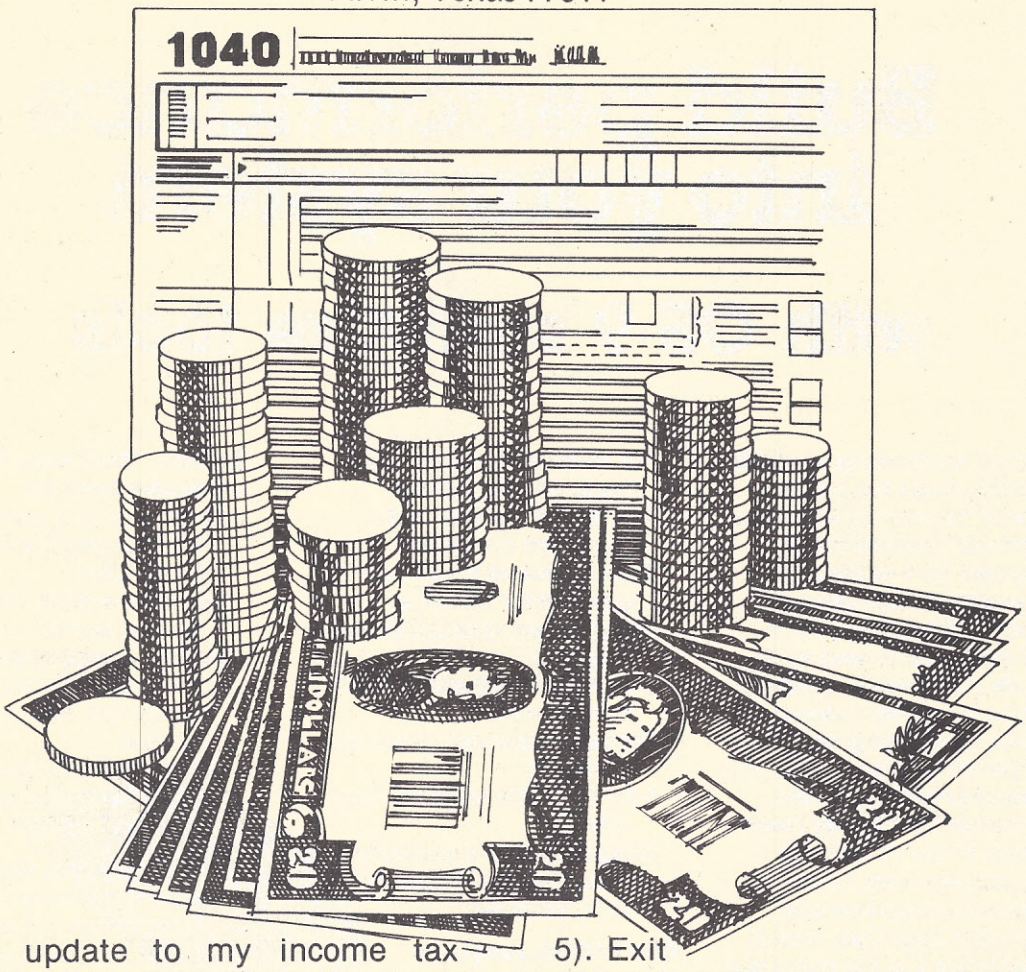
Alvin, Texas 77511




This is an update to my income tax program which you published in the April 1982 issue of Color Computer News. This update has a revised format and calculations to match the 1040 tax form for 1982. There are also some enhancements over last year's program.

This program features:

1. An option to save the data on a cassette file for later revision or printout.
2. A revised format and calculations to match the 1982 tax form.
3. A filing status of single or married filing jointly.
4. Optional output to printer or screen.
5. Each entry consists of 3 variables:
L$(n) is the line number from Form 1040;
A(n) is the value of the entry;
X$(n) is a 16 character description of each entry.
6. The menu options of the program are:
   1). Initialize data
   2). Read and print file to CRT
   3). Change data
   4). Store data
   5). Exit
7. In option 1, the entries are initialized from data statements, the tax calculations are made, and the results are printed on the screen or printer.
8. In option 4, the entries are stored in a cassette file. When storing, a blank leader is inserted to avoid problems when using the same tape locations for storing data a number of times.
9. Option 2 reads the cassette file and prints the data to the CRT or printer.
10. Option 3 allows the A array to be changed for any line number on the tax form.
11. The output is displayed on the screen in sets of 14 lines. Pressing any key will cause the next set of 14 lines to be displayed. The printer output, of course, prints the entire tax form.

```
10 '  FORM 1040  TAXES  1982
12 ' JESS SOFTWARE  <C> 1982
80 CLEAR900:CLS
90 NL=58:' NO OF LINES
92 DIM L$(NL+1),A(NL+1),X$(NL+1)
```

```
100 INPUT"OUTPUT TO SCREEN (0) O
R          PRINTER (2)";PR
102 PRINT:INPUT"FILING STATUS: S
INGLE=0,           MARRIED FILING
 JOINTLY=1 ";FS
110 PRINT" OPTIONS:"
120 PRINT"    1. INITIALIZE DATA.
"
130 PRINT"    2. READ & PRINT FIL
ES TO CRT"
140 PRINT"    3. CHANGE DATA."
150 PRINT"    4. STORE FILES."
160 PRINT"    5. EXIT."
170 INPUT N
180 ON N GOSUB 300,500,700,900,9
999
190 GOTO 110
300 ' INITIALIZE DATA
310 FOR X=1TONL:'READ DATA
320 READ L$(X):READ A(X):READ X$
(X)
330 NEXT
340 GOSUB 1200:'DO CALC
350 GOSUB 1600:'PRINT DATA
380 RETURN
500 ' READ & PRINT FILES
510 GOSUB 2400:'READ FILE
520 GOSUB 1600:'PRINT DATA
530 RETURN
700 ' CHANGE DATA
710 IF L$(1) <> "" THEN 740
720 CLS:PRINT:PRINT" DATA NOT IN
ITIALIZED":RETURN
740 GOSUB 3000:' CHANGE DATA
750 GOSUB 1200:' DO CALC
760 GOSUB 1600:' PRINT DATA
770 RETURN
900 ' STORE DATA
910 IF L$(1) <>"" THEN 930
920 CLS:PRINT:PRINT" DATA NOT IN
ITIALIZED."
925 GOTO950
930 GOSUB 2000:' SETUP & RUN LEA
DER
940 GOSUB 2200:' STORE DATA
950 RETURN
1200 ' DO CALC
1210 IF FS=0 THENA(4)=100
1220 A(5)=A(3)-A(4)
1230 IF A(5)<0 THEN A(5)=0
1240 A(17)=A(1)+A(2)+A(5)+A(6)+A
(7)+A(8)+A(9)+A(10)+A(11)+A(12)+
A(14)+A(15)+A(16)
1250 A(25)=A(18)+A(19)+A(20)+A(2
1)+A(22)+A(23)+A(24)
1260 A(26)=A(17)-A(25):'ADJUSTED
 GROSS
1270 A(27)=A(26)
1275 A(30)=A(27)-A(28)-A(29)
1280 A(32)=A(30)-A(31):'  TAXABL
E INCOME
1290 GOSUB 8000:' FIND TAX
1300 A(35)=A(33)+A(34)
1305 A(42)=A(36)+A(37)+A(38)+A(3
9)+A(40)+A(41)
1310 A(43)=A(35)-A(42)
1312 IF A(43)<0 THEN A(43)=0
1320 A(51)=A(43)+A(44)+A(45)+A(4
6)+A(47)+A(48)+A(49)+A(50)
1330 A(56)=A(52)+A(53)+A(54)+A(5
5)
1340 A(58)=0:A(57)=0
1350 A=A(56)-A(51)
1360 IF A>0 THEN A(57)=A ELSE A(
58)=-A
1370 RETURN
1600 ' PRINT DATA - 14 LINES AT
 A TIME - PRESS <ENTER> TO CONTI
NUE
1610 X=0
1620 FOR J=1 TO 14*(2*PR+1)
1630 X=X+1
1640 IF X>NL THEN 1690
1650 PRINT#-PR,TAB(1+PR*3);L$(X)
;TAB(4+PR*3);:PRINT#-PR, USING "
#####";A(X);:PRINT#-PR,TAB(10+PR
*3);X$(X)
1660 NEXT
1670 K$=INKEY$
1680 IF K$="" THEN 1670 ELSE 162
0
1690 PRINT:PRINT"PRESS <ENTER> T
O CONTINUE";:INPUT K$
1700 CLS:RETURN
2000 ' SETUP & RUN HEADER
2010 CLS:PRINT" POSITION TAPE TO
 SAVE DATA"
2020 PRINT" PRESS RECORD & PLAY
BUTTONS"
2030 PRINT" PRESS <ENTER> WHEN R
EADY"
2040 INPUT K$
2050 MOTOR ON:FOR J=1TO8000:NEXT
:MOTOR OFF
2060 RETURN
2200 ' SAVE DATA
2210 OPEN "O",#-1,"TAX FILE"
2220 FOR J=1TO NL
2230 PRINT#-1,L$(J);A(J);X$(J)
2240 NEXT
2250 CLOSE #-1
2260 RETURN
2400 ' READ DATA FILE
2410 CLS:PRINT"POSITION TAPE AT
START OF FILE"
2411 PRINT"PRESS PLAY BUTTON"
```

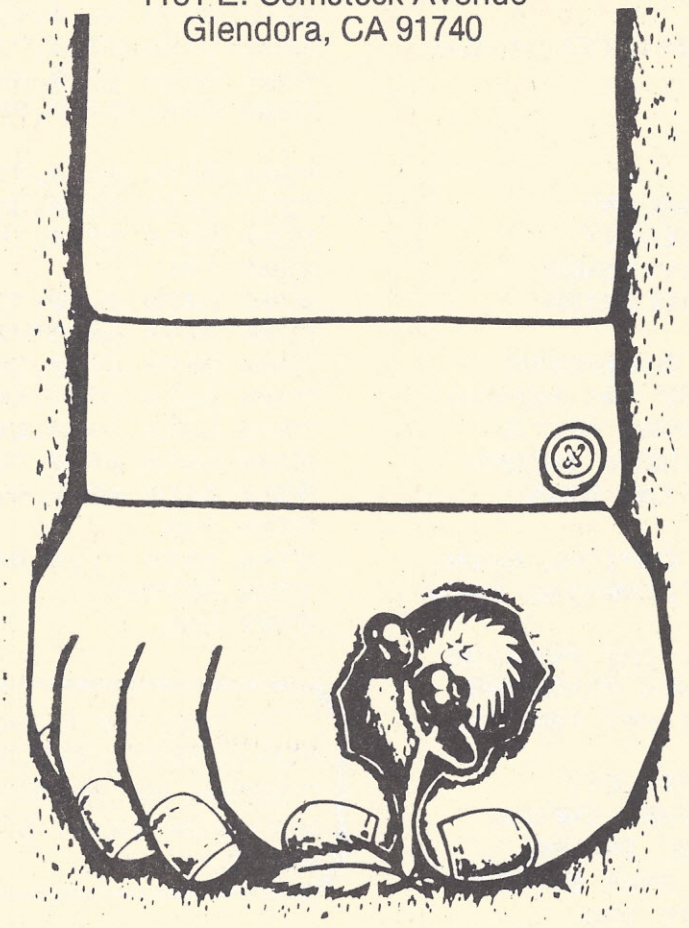
```
2412 PRINT"PRESS <ENTER> WHEN RE
ADY"
2413 INPUT K$
2420 OPEN "I",#-1,"TAX FILE"
2430 FOR J=1TO NL+1
2440 IF EOF(-1)  THEN 2470
2450 INPUT #-1,L$(J):INPUT#-1,A(
J):INPUT#-1,X$(J)
2460 NEXT
2470 CLOSE #-1
2480 RETURN
3000 ' CHANGE DATA
3010 CLS::INPUT"WHICH LINE DO YO
U WISH TO CHANGE";M$
3020 FOR X=1 TO NL
3030 IF M$=L$(X) THEN 3070
3040 NEXT
3050 PRINT:PRINT"LINE NO. CANNOT
 BE FOUND"
3060 RETURN
3070 PRINT:PRINT L$(X);A(X);X$(X
)
3080 INPUT" WHAT IS NEW VALUE";A
(X)
3090 PRINT:PRINT"DO YOU WISH TO
CHANGE ANY MORE";
3100 INPUT M$
3110 IF LEFT$(M$,1)="Y" THEN 301
0
3120 RETURN
8000 ' CALC TAX
8010 A1=INT((A(32)-1)/50)*50+25:
'      TAXABLE INCOME
8020 IF FS=0 THEN 8300
8030 'MARRIED FILING JOINTLY
8036 IF A1 <=16000 THEN 8100
8038 IF A1 <=20200 THEN 8113
8040 IF A1<= 24600 THEN 8117
8050 IF A1<= 29900 THEN 8120
8060 IF A1<= 35200 THEN 8140
8070 IF A1<= 45800 THEN 8160
8080 IF A1<= 50000 THEN 8180
8085 IF A1<= 60000 THEN 8192
8090 IF A1<= 85600 THEN 8200
8092 GOTO8220
8100 PRINT"TAXABLE INCOME IS OUT
SIDE PROGRAM!!!"
8110 RETURN
8113 A(33)=INT(0.22*(A1-16000)+2
013+0.5)
8114 RETURN
8117 A(33)=INT(0.25*(A1-20200)+2
937+0.5)
8118 RETURN
8120 A(33)=INT(0.29*(A1-24600)+4
037+0.5)
8130 RETURN
8140 A(33)=INT(0.33*(A1-29900)+5
574+0.5)
8150 RETURN
8160 A(33)=INT(0.39*(A1-35200)+7
323+0.5)
8170 RETURN
8180 A(33)=INT(0.44*(A1-45800)+1
1457+0.5)
8190 RETURN
8192 A(33)=INT(0.44*(A(32)-45800
)+11457.5)
8194 RETURN
8200 A(33)=INT(0.49*(A(32)-60000
)+17705+0.5)
8210 RETURN
8220 A(33)=INT(0.50*(A(32)-85600
)+30249+0.5)
8230 RETURN
8300 'SINGLE
8330 IF A1 <=6500 THEN 8100
8340 IF A1 <=8500 THEN 8500
8350 IF A1 <=10800 THEN 8520
8360 IF A1 <=12900 THEN 8540
8370 IF A1 <=15000 THEN 8560
8380 IF A1 <=18200 THEN 8580
8390 IF A1 <=23500 THEN 8600
8400 IF A1 <=28800 THEN 8620
8410 IF A1 <=34100 THEN 8640
8420 IF A1 <=41500 THEN 8660
8425 IF A1 <=50000 THEN 8680
8430 GOTO 8700
8500 A(33)=INT(0.17*(A1-6500)+60
8.5)
8510 RETURN
8520 A(33)=INT(0.19*(A1-8500)+94
8.5)
8530 RETURN
8540 A(33)=INT(0.22*(A1-10800)+1
385.5)
8550 RETURN
8560 A(33)=INT(0.23*(A1-12900)+1
847.5)
8570 RETURN
8580 A(33)=INT(0.27*(A1-15000)+2
330.5)
8590 RETURN
8600 A(33)=INT(0.31*(A1-18200)+3
194.5)
8610 RETURN
8620 A(33)=INT(0.35*(A1-23500)+4
837.5)
8630 RETURN
8640 A(33)=INT(0.40*(A1-28800)+6
692.5)
8650 RETURN
8660 A(33)=INT(0.44*(A1-34100)+8
812.5)
8670 RETURN
8680 A(33)=INT(0.50*(A1-41500)+1
```

```
2068.5)
8690 RETURN
8700 A(33)=INT(0.50*(A(32)-41500
)+12068.5)
8710 RETURN
9000 ' DATA INPUT
9009 ' 1
9010 DATA 7,30000,SALARY
9020 DATA 8,324,INTEREST
9030 DATA 9A,412,DIVIDENDS
9050 DATA 9B,200,EXCLUSION
9059 '5
9060 DATA 9C,0,NET DIVIDENDS
9063 DATA 10,0,STATE TAX REFUND
9064 DATA 11,0,ALIMONY REC'D
9065 DATA 12,0,BUSINESS INCOME
9070 DATA 13,0,CAPITAL GAIN
9073 '10
9074 DATA 14,0,40% CAPITAL GAIN
9080 DATA 15,0,SUPPLEMENTAL GAIN

9090 DATA 16,0,FULL TAX PENSION
9100 DATA 17A,0,OTHER PENSIONS
9110 DATA 17B,0,TAX AMT PAGE 10
9119 '15
9120 DATA 18,0,TRUSTS ETC
9130 DATA 21,130,OTHER INCOME
9140 DATA 22,0,TOTAL INCOME
9150 DATA 24,0,EMPLOYEE EXPENSE
9160 DATA 25,2000,TO IRA
9162 DATA 26,0,KEOGH PAYMENTS
9163 DATA 27,0,INTEREST PENALTY
9164 DATA 28,0,ALIMONY PAID
9165 DATA 29,0,MARRIED DEDUCT
9166 DATA 30,0,DISABILITY INCOME

9169 '25
9170 DATA 31,0,TOTAL ADJUSTMENT
9180 DATA 32,0,ADJUSTED GROSS
9190 DATA 33,0,FROM LINE 32
9200 DATA 34A,1600,FROM SCH A
9202 DATA 34B,0,CHARITY CONTRIB
9203 '30
9204 DATA 35,0,33 -34A OR 34B
9210 DATA 36,7000,EXEMPTIONS
9220 DATA 37,0,TAXABLE INCOME
9230 DATA 38,0,TAX
9240 DATA 39,0,ADDITIONAL TAX
9249 '35
9250 DATA 40,0,TOTAL
9255 DATA 41,0,ELDERLY CREDIT
9256 DATA 43,0,INVEST CREDIT
9260 DATA 44,0,POLITICAL CONTR
9265 DATA 45,0,CHILD CARE
9269 '40
9270 DATA 47,90,ENERGY CREDIT
9272 DATA 48,0,OTHER CREDITS
9274 DATA 49,0,TOTAL CREDITS
9280 DATA 50,0,BALANCE (TAX)
9282 DATA 51,0,SELF EMPLOY TAX
9283 DATA 52,0,MINIMUM TAX
9284 DATA 53,0,ALTERNATIVE TAX
9285 DATA 54,0,PRIOR-YEAR INVEST

9286 DATA 55,0,FICA ON TIPS
9287 DATA 56,0,UNCOLLECTED FICA
9288 DATA 57,0,IRA TAX
9289 '51
9290 DATA 59,0,TOTAL TAX
9300 DATA 60,5978,FIT WITHHELD
9304 DATA 61,0,ESTIMATED TAX
9305 DATA 62,0,EARNED CREDIT
9310 DATA 64,0,EXCESS FICA
9320 DATA 67,0,TOTAL WITHHELD
9330 DATA 68,0,OVERPAID
9339 '58
9340 DATA 71,0,BALANCE DUE IRS
9350 RETURN
9999 END
```

To keep the screen on text or Graphics POKE359,57 and SCREEN 1,1 will show the graphics, you will still be able to type, but it will not be shown. SCREEN 0,1 inverses the screen.

# PICK A NUMBER FROM 00000 TO FFFFF

By Walter L. Rochette
1151 E. Comstock Avenue
Glendora, CA 91740



Overpowering evidence exists that the ancient Mayans of Central America ran around barefooted (even in formal and work attire), and that early Arabs were wont to wear shoes. What led to this startling deduction — The systems of numbers they used! Arabs, and earlier, the Egyptian and Babalonians, used numerical notations to the Base Ten, but not those old Mayans — Their system was based on Twenty (10 toes and 10 fingers — (6 on one hand and 4 on the other, maybe???))

Were the Mayans good at using their system? You Betcha they were! They calculated Solar and Lunar Eclipses back some 300,000 years, and forward an infinitum - a long way that can be expressed in very few Mayan Numerals. (Five Mayan digits can represent values from zero to 3,199,999 — for whatever that's worth). Fortunately, having at least half a brain working, it became apparent to me that the greater the value of the System Base, the greater the numerical value that could be expressed with fewer digits. Now all that is needed is for someone to start using all letters of the alphabet for a Base-26 system to express astronomical distances in layman's terms. Wow! 25 ''Y's'' in a row would represent a decimal number of (2 x 26 to the 26th power minus 1). Or, only 5 of these HEXADECIMAL digits could be used to count up to 11,881,375 (Decimal).

Based upon this line of reasoning, early Computer Circuit Designers must have been all thumbs! Thus BASE TWO, where it only takes sixteen ''1's'' to count to 65535 — So much for that!

Now that these important revelations have been made - where did OCTAL, DUODECIMAL and HEXADECIMAL originate? With a herd of Super Centipedes with legs missing? And, how about ''8421 BCD Code'', ''GRAY Code'', ''DATEX Code'', ——

Whoa, Walt! We've heard of OCTAL and HEXADECIMAL (''HEX'') relative to computers, but what about that there DUODECIMAL Jazz? DUODECIMAL, obviously, was developed by a gang of Cookie Bakers. Their Base-Twelve system of notation counted by Quarter-Dozens,

Half-Dozens, Grosses, Great-Grosses, etc.. However, it is suspected that some Cooking Sherry Saturated Bakers erroneously counted thirteen to the dozen, whereupon a progressive element of the population, seeing a good thing, eagerly ate it up, seized upon the idea and adopted the new Baker's Dozen as a unit, thereby screwing up the whole system. (Pure conjecture of course!)

I must apologize, CC Users and CC News readers! Bill Sias likes to have a few kind and helpful words introducing his CC NEWS printed programs and I just got carried away, so let's get my tongue unstuck from my cheek and get down to business.

In the course of programming, it is often helpful to be able to bounce between DECIMAL and HEX notations. Because of this, I wrote a little program with line numbers away up out of the reach of those line numbers normally used in programming.

When this program, (''&H-&0-BN'') sits in place in memory, available for interrogation, and you want to know the HEX equivalent of a Decimal quantity or visa versa, just address the program, do the conversion, then return to programming. The program which follows also does HEX to DECIMAL, OCTAL to DECIMAL, DECIMAL to OCTAL, DECIMAL to BINARY and BINARY to DECIMAL translations, and if used in two steps any of the foregoing codes to any other. How's that for convenience!

By the time all this was completed, I was feeling numb and snuck in a ''SNEAK-A-PEEK'' subprogram. This turned out to have exciting results for it became possible to type in a couple of numbers and then just sit back and read anything or everything in memory, from PEEK(0) to PEEK(65535). The ''PEEKed'' at line numbers scroll up in one column, ASCII Codes in another, and lo and behold, the Characters scroll up in a third column in READABLE FORM. Scrolling is stopped by the usual method of pressing SHIFT and @ together. Pressing any key continues the scrolling.

A neat thing about this program is that each sub-program stands alone and may be written as a separate program.

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Now, let's take a closer look at the sub-programs that do the code translations:

CONVERSION OF HEX TO DECIMAL is done by tricking the computer into revealing the Decimal equivalent of a HEX-IDENTIFIED, memory location. (Remember, single HEX Digits count from ''0'' to ''15'' — 0 1 2 3 4 5 6 7 8 9 A B C D E F)

CONVERSION OF DECIMAL TO HEX is no sweat; I used the translator built into Extended Basic to take care of this chore.

CONVERSION OF DECIMAL TO OCTAL gets a little stickier. This must be calculated, but the computer zips through it quickly and the conversion appears before you can blink twice. (See that part of the program following the REM: ''convert decimal to octal'', to see how it's done.) (Remember, single Octal Digits only count from 0 to 7).

CONVERSION OF OCTAL TO DECIMAL was simple to program, the computer has a built-in routine for this. (On second thought, it may also have a built in reverse routine, but if it has I'm not aware of it. Perhaps some of the readers are). When doing an Octal to Decimal conversion, don't try to write an Octal Number with an ''8'' or a ''9'' in it or you'll get an ''SN'' error. No one ever told OCTAL about 8's and 9's, so it just doesn't know these figures exist!

CONVERSION OF DECIMAL TO BINARY is done in one long program statement, see that portion of the program following the ''convert decimal to binary ''REM'' statement to understand what's done. You can see that it is in a manner similar to the Decimal to Octal conversion, except that it works with exponential powers of the Base Two.

CONVERSION OF BINARY TO DECIMAL notation follows what is now the classic method and is quite simple once you get the hang of it. The first step is look at the Decimal number. If it's ODD, subtract ''1'' from it to make it even; if it's an Even

Number, subtract ''0''. Then place the ''1'' or the ''0'' off to one side. THIS IS THE LEAST SIGNIFICANT BINARY BIT (LSB). You now have an Even number and a Binary Digit off to one side. Next, take that ''even'' Decimal number and divide it by 2. If the result is an ODD number, subtract ''1'' to make it even or subtract ''0'' to leave it Even. The ''1'' or the ''0'' becomes the NEXT LEAST SIGNIFICANT BINARY BIT. Continue doing the same thing, until you reach Decimal ''0''. The group of BITs you have accumulated is the BINARY NUMBER. There, that wasn't so difficult was it!
Here's an example. Follow it through:

Decimal Number: 8577 It's Odd, Subtract 1
Revised Number: 8576
Divide by 2 = 4288 It's Even, Subtract 0
Revised Number: 4288
Divide by 2 = 2144 It's Even, Subtract 0
Revised Number: 2144
Divide by 2 = 1072 It's Even, Subtract 0
Revised Number: 1072
Divide by 2 = 536 It's Even, Subtract 0
Revised Number: 536
Divide by 2 = 268 It's Even, Subtract 0
Revised Number: 286
Divide by 2 = 134 It's Even, Subtract 0
Revised Number: 134
Divide by 2 = 67 It's Odd, Subtract 1
Revised Number: 66
Divide by 2 = 33 It's Odd, Subtract 1
Revised Number: 32
Divide by 2 = 16 It's Even, Subtract 0
Revised Number: 16
Divide by 2 = 8 It's Even, Subtract 0
Revised Number: 8
Divide by 2 = 4 It's Even, Subtract 0
Revised Number: 4
Divide by 2 = 2 It's Even, Subtract 0
Revised Number: 2
Divide by 2 = 1 It's Odd, Subtract 1
Revised Number: 0

And the Binary Number = (LSB) 10000001100001 (MSB)

How did we do that? Just slid the bottom Binary bit to the right and let the whole pile follow it down. Try it with pencil and paper (you can do half of each operation in your head by writing down the Bit and mentally setting up the next number to be divided)

BINARY TO DECIMAL CONVERSION is quite straight forward. Line up your Binary number with its least significant bit to the left. Spread it out so that you can put the ascending powers of 2 in order above each bit. 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8191, 16382, 32764 (That's all you need for the memory range of the 32K TRS-80 CC, 16382 for the 16K Model)

Got that done? Now add up the decimal values which appear over each ''1'' in the Binary Number, and you have converted the Binary Number to Decimal Notation.

The Binary to Decimal Conversion in the program, in essence, does the same thing; Okay? Now go ahead and let your friends think you are a wizard, copy the program, and use it in good mental health! As a closing thought ''8421 BCD'' uses only four Binary Bits to represent Decimal DIGITS, as follows:

0=0000, 1=0001, 2=0010, 3=0011, 4=0100, 5=0101, 6=0110, 7=0111, 8=1000, and 9=1001. (For instance, Decimal 983 coded in 8421BCD would be ''1001 1000 0011''). This leaves the following combinations unused: 1010, 1011, 1100, 1101, 1110 and 1111. In some systems these unused combinations are put to work checking for errors.

And, as an afterthought, be sure to run that crazy program ending with video sound turned up. Ready to go to work? Here's the program. Go!

```
10 '       "CONVERSIONS"
20 '
30 '  COPYRIGHTED, 1982, BY
40 '  BY WALTER L. ROCHETTE
50 '  1151 E. COMSTOCK AVE.
60 '   GLENDORA, CA 91740
70 '
80 ' EXCLUDED FROM COPYRIGHT:
90 '  PART 1 HEREOF, ADAPTED
100 '    FROM FRANK HOGG'S
110 '   ARTICLE IN C.C.NEWS
120 '        ISSUE NO. 7
130 '        MARCH, 1982
140 '
150 '
160 'NOTE CODE CONVERSIONS ARE
     LIMITED TO THE FOLLOWING:
170 '65535 IN DECIMAL NOTATION,
180 'HFFFF IN HEXADECIMAL,
190 '177777 IN OCTAL, AND
```

```
200 '111111111111111 IN BINARY.
210 '
220 '
230 DIM D$(17),S(17)
240 CLS:PRINT@102," DO YOU WISH
TO:"
250 PRINT:PRINT"  1. COPY ROM TO
 RAM"
260 PRINT"  2. READ PART OR ALL
OF RAM      3. CONVERT HEX TO DE
CIMAL       4. CONVERT DECIMAL T
O HEX       5. CONVERT DECIMAL T
O OCTAL     6. CONVERT OCTAL TO
DECIMAL"
270 PRINT"  7. CONVERT DECIMAL T
O BINARY    8. CONVERT BINARY TO
 DECIMAL    9. END PROGRAM",,,"
          (WHICH) ?"
280 K$=INKEY$:IFK$=""THEN 280 EL
SE IF K$="1"THEN 300 ELSE IF K$=
"2"THEN320 ELSE IF K$="3" THEN 1
120 ELSE IF K$="4"THEN 1230 ELSE
 IF K$="5" THEN 1330 ELSE IF K$=
"6" THEN 1530 ELSE 290
290 IF K$="7"THEN 1630 ELSE IF K
$="8" THEN 1830 ELSE IF K$="9" T
HEN 2140 ELSE 280
300 PRINT:PRINT"  ROM NOW BEING
COPIED TO RAM"
310 FOR IN=1TO 500:NEXT IN:GOTO4
20
320 CLS:PRINT:PRINT:PRINT:PRINT"
  AT WHAT DECIMAL POSITION IN
  RAM DO YOU WANT TO START
  PEEKING?
330 INPUT ST
340 PRINT:PRINT"  AT WHICH DECIM
AL LOCATION DO    YOU WANT TO ST
OP PEEKING?"
350 INPUT EN:GOTO1020
360 PRINT@483,"PRESS ANY KEY TO
CONTINUE"
370 K$=INKEY$:IF K$=""THEN370 EL
SE RETURN
380 '
390 '
400 '    copy rom to ram
410 ' this part of program is by
              frank hogg
420 CLEAR 256,&H7EFF
430 GOSUB 850: SA=H
440 GOSUB 850: EA=H
450 GOSUB 850: EP=H
460 FOR A=SA TO EA
470 GOSUB 850
480 POKE A,H
490 NEXT A
500 DEFUSR0=EP
510 X=USR0(0)
520 PRINT:PRINT"      BASIC IS NO
W IN RAM;"
530 PRINT"       ROMS ARE DISABLE
D."
540 PRINT
550 FORI=1 TO 1000
560 NEXT I
570 POKE &HAA79,ASC("W")
580 POKE &HAA7A,ASC("R")
590 POKE &HAA7B,ASC("I")
600 POKE &HAA7C,ASC("T")
610 POKE &HAA7D,ASC("E")+&H80
620 PRINT:PRINT" THE SPELLING OF
"
630 PRINT" 'PRINT' HAS NOW BEEN"
640 PRINT" CHANGED TO 'WRITE'."
650 PRINT
660 PRINT" LIST 490-560 TO SEE"
670 PRINT" FOR YOURSELF:"
680 PRINT
690 FORI=1 TO 1000
700 NEXT I
710 LIST 430-490
720 END
730 DATA 7F00, 7F19, 7F00
740 DATA 1A,50
750 DATA 8E,80,00
760 DATA A6,84
770 DATA B7,FF,DF
780 DATA A7,80
790 DATA B7,FF,DE
800 DATA 8C,FF,00
810 DATA 26,F1
820 DATA B7,FF,DF
830 DATA 1C,AF
840 DATA 39
850 READ A$
860 LZ=LEN(A$)
870 H=0
880 IF LZ<=0 THEN RETURN
890 C$=LEFT$(A$,1)
900 FOR I=0 TO 15
910 IF I<>0 THEN 930
920 IF C$="0" THEN 960
930 IF C$=HEX$(I) THEN 960
940 NEXT I
950 RETURN
960 H=H*16+I : LZ=LZ-1
970 A$=RIGHT$(A$,LZ)
980 GOTO 890
990 '
1000 '
1010 'read random access memory
1020 FOR R=ST TO EN
1030 B=PEEK(R)
1040 PRINTR"="B,CHR$(B)
1050 FOR IN=1TO100:NEXT IN
```

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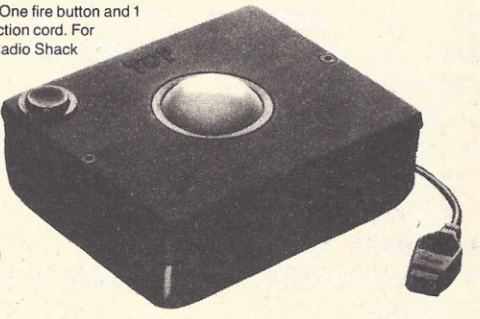

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```
1060 NEXT R
1070 PRINT:PRINT"  WANT TO RETUR
N TO THE MENU ?"
1080 K$=INKEY$:IF K$="" THEN 108
0 ELSE IFK$="Y" THEN 240 ELSE IF
 K$="N" THEN 2140 ELSE 1080
1090 '
1100 '
1110 '  convert hex to decimal
1120 CLS:PRINT:PRINT" CONVERT HE
XADECIMAL TO DECIMAL      FROM &
H0000 TO &HFFFF":PRINT
1130 PRINT" ENTER THE HEX.#: IE,
 '&H####'    AND PRESS <ENTER>";
1140 INPUT"  ";H
1150 N=PEEK(H):PRINT"          =
 DEC"H
1160 PRINT:PRINT" PRESS 'H'(HEX)
 OR 'R'(RETURN)"
1170 R$=INKEY$:IFR$=""THEN1170 E
LSE IFR$="R"THEN 240 ELSE 1180
1180 CLS:PRINT:PRINT:INPUT" ENTE
R THE HEX. NO.";H
1190 GOTO1150
1200 '
1210 '
1220 '  convert decimal to hex.
1230 CLS:PRINT:PRINT"          C
ONVERSION                DECIMAL
 TO HEXADECIMAL"
1240 PRINT:PRINT"  ENTER DECIMAL
 NO. ";:INPUT N:GOTO 1280
1250 PRINT:PRINT" PRESS 'H'(HEX)
 OR 'R'(RETURN)"
1260 K$=INKEY$:IFK$=""THEN1260 E
LSE IF K$="R"THEN 240
1270 CLS:PRINT:PRINT:INPUT"  ENT
ER DECIMAL NO. ";N
1280 PRINT"  HEX EQUIVALENT IS
&H"HEX$(N)
1290 GOTO 1250
1300 '
1310 '
1320 'convert decimal to octal
1330 CLS:PRINT:PRINT"  DECIMAL T
O OCTAL CONVERSION:"
1340 PRINT:PRINT" ENTER THE DECI
MAL NO.";
1350 INPUT N
1360 D(1)=INT(N/32768)
1370 R=N-(32768*D(1))
1380 D(2)=INT(R/4096)
1390 R=R-(4096*D(2))
1400 D(3)=INT(R/512)
1410 R=R-(512*D(3))
1420 D(4)=INT(R/64)
1430 R=R-(64*D(4))
1440 D(5)=INT(R/8)
```

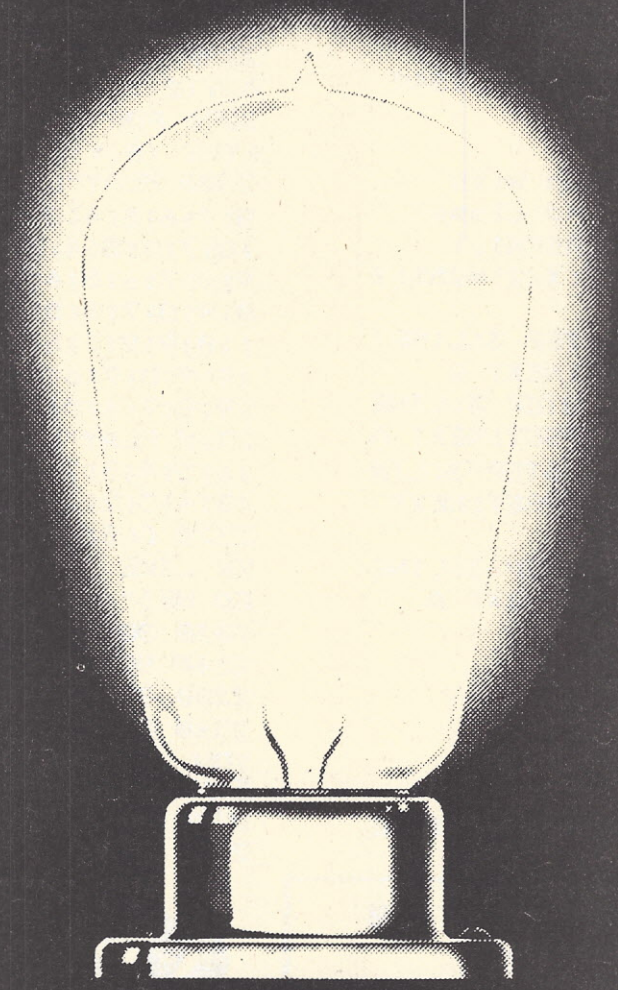
```
1450 R=R-(8*D(5))
1460 D(6)=R
1470 PRINT" THE OCTAL EQUIVALENT
 ="(D(6)+(D(5)*10)+(D(4)*100)+(D
(3)*1000)+(D(2)*10000)+(D(1)*100
000))
1480 PRINT:PRINT" ANOTHER ? (Y/N
)
1490 Q$=INKEY$:IF Q$=""THEN 1490
 ELSE IF Q$="Y" THEN CLS:GOTO 13
40 ELSE IF Q$="N" THEN 240 ELSE
1490
1500 '
1510 '
1520 ' covert octal to decimal
1530 CLS:PRINT@66,"OCTAL TO DECI
MAL CONVERSION"
1540 PRINT
1550 PRINT:PRINT" ENTER THE OCTA
L NO. (&O######)"
1560 INPUT"  ";N
1570 PRINT"  ="N" DECIMAL
1580 PRINT:PRINT"        MORE?  (
Y/N)"
1590 K$=INKEY$:IFK$=""THEN1590 E
LSE IF K$="Y" THEN CLS: GOTO 154
0 ELSE IF K$="N" THEN 240 ELSE 1
590
1600 '
1610 '
1620 ' convert decimal to binary
1630 CLS:PRINT@66,"DECIMAL TO BI
NARY CONVERSION"
1640 PRINT:PRINT"  ENTER THE DEC
IMAL NUMBER YOU    WISH TO CONVE
RT TO BINARY.      (BINARY NO. W
ILL HAVE MOST-     SIGNIFICANT-D
IGIT FIRST)"
1650 INPUT"  ";BN
1660 IF BN>32767 THEN N=15 ELSE
IF BN<32768 AND BN>16383 THEN N=
14 ELSE IF BN<16384 AND BN>8191
THEN N=13 ELSE IF BN<8192 AND BN
>4095 THEN N=12 ELSE IF BN<4096
AND BN>2047 THEN N=11 ELSE IF BN
<2048 AND BN>1023 THEN N=10
1670 IF BN<1024 AND BN>511 THEN
N=9 ELSE IF BN<512 AND BN>255 TH
EN N=8 ELSE IF BN<256 AND BN>127
 THEN N=7 ELSE IF BN<128 AND BN>
63 THEN N=6 ELSE IF BN<64 AND BN
>31 THEN N=5 ELSE IF BN<32 AND B
N>15 THEN N=4 ELSE IF BN<16 AND
BN>7 THEN N=3
1680 IF BN<8 AND BN>3 THEN N=2 E

LSE IF BN<4 AND BN>1 THEN N=1 EL
SE IF BN<1 THEN N=0
1690 M=N
1700 FOR Z=0 TO N
1710 IF BN/2=INT(BN/2) THEN D$(Z
)="0" ELSE D$(Z)="1"
1720 BN=INT(BN/2)
1730 NEXT Z:GOTO 1740
1740 PRINT"  BINARY = ";
1750 FOR W= M TO 0 STEP-1
1760 PRINT D$(W);:NEXT W
1770 PRINT:PRINT:PRINT"
MORE ? (Y/N)"
1780 K$=INKEY$:IF K$="Y" THEN 17
90 ELSE IF K$="N" THEN 240 ELSE
1780
1790 CLS:PRINT:PRINT"  ENTER DEC
IMAL NO. ";:INPUT BN:GOTO1660
1800 '
1810 '
1820 'convert binary to decimal
1830 CLS:PRINT@66,"BINARY TO DEC
IMAL CONVERSION"
1840 PRINT@130,"  ENTER BINARY N
UMBER, LEAST       SIGNIFICANT DI
GIT FIRST.         PRESS <=> WHEN
 COMPLETED."
1850 PRINT@228,;
1860 FOR N=1 TO 17
1870 B$=INKEY$:IF B$=""THEN 1870
ELSE IF B$=CHR$(32) THEN 1870
1880 IF B$<>"1" THEN D$(N)="0":
GOTO1890 ELSE IF B$="1" THEN D$(
N)="1": GOTO 1890 ELSE IF B$="="
 THEN 1890 ELSE 1870
1890 PRINTB$;:IF B$="="THEN 1910
1900 NEXT N
1910 IF D$(16)="1" THEN DC=32768
1920 IF D$(15)="1" THEN DC=DC+16
384
1930 IF D$(14)="1" THEN DC=DC+81
92
1940 IF D$(13)="1" THEN DC=DC+40
96
1950 IF D$(12)="1" THEN DC=DC+20
48
1960 IF D$(11)="1" THEN DC=DC+10
24
1970 IF D$(10)="1" THEN DC=DC+51
2
1980 IF D$(9)="1" THEN DC=DC+256
1990 IF D$(8)="1" THEN DC=DC+128
2000 IF D$(7)="1" THEN DC=DC+64
2010 IF D$(6)="1" THEN DC=DC+32
2020 IF D$(5)="1" THEN DC=DC+16
2030 IF D$(4)="1" THEN DC=DC+8
2040 IF D$(3)="1" THEN DC=DC+4
2050 IF D$(2)="1" THEN DC=DC+2
2060 IF D$(1)="1" THEN DC=DC+1
2070 PRINT DC
2080 PRINT:PRINT"          MORE ?
```

```
 (Y/N)"
2090 K$=INKEY$:IF K$=""THEN2090
ELSE IF K$="Y" THEN 2100 ELSE IF
 K$="N" THEN 240 ELSE 2090
2100 DC=0:N=0:Z=0:CLS:GOTO 1840
2110 '
2120 '
2130 '  wrap program up with
       sight, sound and class!
2140 PMODE4,1:PCLS:SCREEN1,1
2150 X=0:Y=0:X(1)=127:X(2)=255:Y
(1)=96:Y(2)=191
2160 FORA=X TO X(2) STEP 3:LINE(
X(1),Y(1))-(A,Y),PSET:NEXT A
2170 FOR A=Y TO Y(2) STEP 3:LINE
(X(1),Y(1))-(X(2),A),PSET:NEXT A
2180 FOR A= X(2) TO X STEP-3:LIN
E(X(1),Y(1))-(A,Y(2)),PSET:NEXT
A
2190 FOR A=Y(2) TO Y STEP-3:LINE
(X(1),Y(1))-(X,A),PSET:NEXT A
2200 GOSUB2260
2210 SCREEN1,0
2220 GOSUB2260
2230 SCREEN1,1
2240 GOSUB2260
2250 GOTO2270
2260 FOR TI=1 TO 1000:NEXT TI:RE
TURN
2270 FOR R=1 TO 180: SOUND R,1:C
IRCLE(X(1),Y(1)),R,0,.75: NEXT R
: GOSUB 2260
2280 FOR A=0 TO 127: LINE(A,Y)-(
A,Y(2)),PRESET :NEXT A
2290 FOR B= 255 TO 127 STEP-1 :
LINE (B,Y(2))-(B,Y),PRESET: NEXT B
2300 PLAY"L100;V5;05;12;11;10;9;
8;7;6;5;4;3;2;1;V7;04;12;11;10;9
;8;7;6;5;4;3;2;1;V9;03;12;11;10;
9;8;7;6;5;4;3;2;1;V11;02;12;11;1
0;9;8;7;6;5;4;3;2;1;V15;01;12;11
;10;9;8;7;6;5;4;3;2;1;V12;12;11;
10;9;8;7;6;5;4;3;2;1;V9;12;11;10
;9;8;7;6;5;4;3;2;1
2310 PLAY"L100;V7;12;11;10;9;8;7
;6;5;4;3;2;1;V5;12;11;10;9;8;7;6
;5;4;3;2;1" : GOSUB2260
2320 CLS:PRINT@230,"CATCH ME LAT
ER LIKE                  WHEN YOU NE
ED ME!"
2330 GOSUB2260
2340 SCREEN 0,1
2350 GOSUB2260
2360 CLS:PRINT@232,"OKEY, CHUM,
YOU                  CAN TURN IT OF
F NOW!"
2370 SCREEN 0,1
2380 GOTO 2380
```

# SOME THOUGHTS ON FLEX® AND 64K

by Frank DuPont
479 W. Willis
Detroit, MI. 48201



I just finished installing the Frank Hogg version of FLEX on my COCO, and I would like to pass on what I found.

The first thing you should do with any new program is make a copy, just in case you screw up bad! Unlike RS disk basic in which you do a DSKINI0 then a BACKUP, in FLEX you do a NEWDISK 0 then you are asked alot of questions. Then you do a PUTBOOT.LDR 0, followed by SDC 0.FLEX.SYS which means "Single Disk Copy" now this is where the fun starts if you only have one disk drive! There are 58 files to copy, one at a time! I felt there must be a better way when I did cause a disk read error and I had to start all over (about one hour)! I still think there is a better way. But I think a second disk drive is really needed with FLEX.

Some of the things that come with the package are:

SCREEN CONTROL: You get a choice of 51x24, 64x24, (chars. x rows) black on white or white on black, there is also 64x32 and 32x16 b/w. the 51x24 is very readable on a color TV but forget the 64 chars., unless you have a monitor. The 32x16 would be nice for those in need of glasses! You can also have protected lines and status lines at the bottom of the screen, these can be in reverse video if you wish.

CBASIC: This is EXT. BASIC that has been changed to allow you to return to FLEX.

MON: Works like CBUG or HUMBUG you can examine memory, do memory dumps etc.

LIST: This is like BASIC but better, you can list all or part of a text file with or without line numbers. You can also have labeled pages with 54 lines per page.

CAT: Is like DIR but you can list all files or only those that you want. For example; "CAT A.BAS" this would list on the screen only those files that start with an A and have the extension BAS.

COPY: Works like DISK BASIC except like CAT it can copy only the files you need.

"COPY ,1,0,.CMD,.SYS" this would copy only files with the extensions CMD and SYS from disk 1 to disk 0. If you just copy one disk to a new formatted disk, your files would be re-grouped to make disk access time faster.

PROT: This is a very nice feature! You can protect files from being renamed, deleted, written to or even cataloged.

HELP: This will use a file named HELPCOCO to aid you in understanding the commands. For example, "HELP CAT" would print information about the CAT command, "HELP D" would list anything that started with a D.

STARTUP: FLEX looks for STARTUP during initialization, where it will perform some special function, like load the editor or print logo on the screen.

SETUP: A complicated command to change the various options within FLEX, like printer baud rate (110-9600), Radio Shack type line feed or normal LF'S. This is also where you change disk parameters too, you can set up double-sided, double density, single sided, single density. You can change the track-to-track stepping rate and get up to 5 times faster access to your data (depending on the drive you have, RS drives = 30 millsec. better ones = 6 millsec.). You also select working drives and system drive numbers here. Another part changes the cursor from a line to a blinking block, the keyboard debounce time, disk motor shutoff time. You can have up to 4 drives but only 3 if one is double-sided. There is more but I wouldn't go into it.

EXEC: The execute command is used to process a text file as a list of commands. This would be the same as if you had typed them in from the keyboard. An example would be to make a new system disk instead of doing a NEWDISK, COPY xx,xx and LINK. You would have this in a file named MAKEDISK and just EXECute it.

BUILD: Is like a small editor you would use with commands like SETUP, STARTUP and EXEC to create a file.

P: This would list to the printer ;"P LIST CAT".

O: This would route all screen output from a utility to an output file instead of the terminal.

EXT: This is for using a serial terminal such as a TVI 910 hooked to the RS232 port of your Color Computer. It is also setup for a Microline 82a hooked to the terminal.

DBASIC: This doesn't come with the $99 package, it is $30 more if you get it at the same time or $40 later. It isn't the same as the RS version because FLEX lives in the same locations Radio Shack uses. Files written in DBASIC are not compatible with DISK BASIC also you can't have random files.

RTF: (part of DBASIC) Copied RADIO SHACK disk to FLEX, but only in ASCII and no machine language.

TTYSET: This utility allows you to change most of the characteristics of a terminal you have hooked to the Color Computer.

There are also functions like naming a disk, auto drive search and error codes in english instead of letter codes that you have to keep looking up!

Frank Hogg has done a first class job, but sometimes they think we are smarter then we are. Their manual is written like I really knew what I was doing, and sometimes I do not! What we need now is people like Clayton Abrams or Roger Degler who writes FLEX CORNER and Frank Hogg to help us get some of our good software like "TELEWRITER", "EDTASM" and "SDS80C" tied to FLEX. We also need to know much more about using FLEX. If you are using FLEX you should also be getting "68 MICRO JOURNAL", they have a Color Computer section and they try hard to do a good job.

I have only covered the highlights of FLEX and I hope people like Roger Degler will fill us in on the details. This is a very good package of programs for the more advanced programmer, but not for the beginner.

If you have already changed to 64K and made the changes that Frank Hogg has written about, you can use the missing 32K without FLEX. I have been using the top 10K to store many useful machine language programs, and this is with Disk Basic running! The program at the end of this article is from Frank Hogg Inc, it changes to memory map type 1 and moves Basic to ram. This works till you try to exit from something like "Humbug" or "Edtasm" (on disk) which causes basic to reset the memory map to type 0 and you lose your program in upper ram. I got around this by stopping Basic from

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clearing all the SAM's(6883) registers, this may not work in all cases but has so far.

In the 1.1 rom at location $A054 is a LDB #$10 (16) this is a counter for the number or registers to clear. I changed it to LDB #$0C (12) in line 270. If you have a 1.0 rom you might try changing the poke to a 12 at location $A05D (41053). I have run this with Disk Basic and Ext. Basic, it should work with Color Basic too.

The disk rom above $D800 (55296) is not used, and is free up to $FF00 (65280). This is almost 10K for your use with the disk rom in. There would be a good 16K with Ext. Basic and 24K with Color Basic! Now that would mean a total of 56K with only Color Basic! Now all we have to do is make some changes in Basic to let us move the graphic pages or program to this free memory.

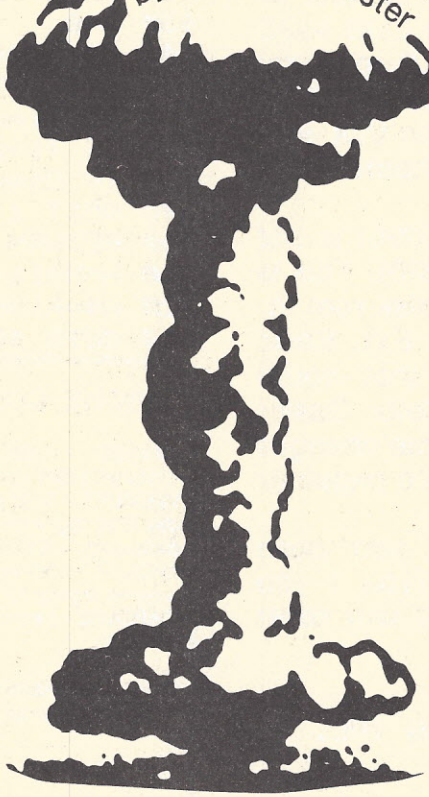
One last important thing, if you push RESET in either FLEX or map type 1 you must start all over, because that will reset the map type to 0.

* FLEX is a trademark of TSC.

```
10 'PROGRAM FROM FRANK HOGG INC.
100 'ROM-MOVE
110 CLEAR 256,&H7EFF
120 GOSUB 410: SA=H
130 GOSUB 410: EA=H
140 GOSUB 410: EP=H
150 'SA=STARTING ADDRESS
160 'EA=END ADDRESS
170 'EP=ENTRY POINT Ø
180 FOR A=SA TO EA
190 GOSUB 410
200 POKE A,H
210 NEXT A
220 DEFUSRØ=EP
230 X=USRØ(Ø)
240 PRINT"BASIC IS NOW IN RAM"
250 PRINT"ROM IS DISABLED"
260 PRINT "MEMORY MAP TYPE 1 INS
TALLED"
270 POKE 41045,12 'STOPS BASIC F
ROM CHANGING MAP TYPE
280 END
290 DATA 7F00,7F19,7F00
300 DATA 1A,50
310 DATA 8E,80,00
320 DATA A6,84
330 DATA B7,FF,DF
340 DATA A7,80
350 DATA B7,FF,DE
360 DATA 8C,FF,00
370 DATA 26,F1
380 DATA B7,FF,DF
390 DATA 1C,AF
400 DATA 39
410 READ A$
420 LZ=LEN(A$)
430 H=Ø
440 IF LZ<=Ø THEN RETURN
450 C$=LEFT$(A$,1)
460 FOR I=Ø TO 15
470 IF (I=Ø)AND(C$="Ø") THEN 510
480 IF C$=HEX$(I) THEN 510
490 NEXT I
500 RETURN
510 H=H*16+I: LZ=LZ-1
520 A$=RIGHT$(A$,LZ)
530 GOTO 450
```

# "CLOAD SABOTAGE"

by Disk Winchester



CASE #256— It was another hot, cotton candy August day in Cmos City, the kind that crashes heads and burns bits. I was hacking away at another of my endless "ULTIMATE" programs when the impatient ringing of the telephone did an unconditional interrupt on my concentration.

"Winchester Detective Agency; this is Disk speaking," I said professionally, trying to hide my irritation at being interrupted.

"Mr. Winchester," said a soft sectored voice, "I need your help. Can you meet me at the Megabyte Restaurant in one hour?"

Quickly I looked at my appointment book, which was as usual totally blank. "My schedule is packed tight, but I'll try to squeeze you in. What did you say your name was?"

"I didn't say but it's Fields—Ms. Hollerith Fields. My friends call me Holly."

I drove at memory-cycle-time speed to the Megabyte in my TRS-8 sports car. It had only been a few minutes, but I couldn't wait to see the face that went with that silky voice. Naturally I was too early, so I ordered a ram burger, fortran fries, and a cup of CoCo to relax me.

Just as I was finishing my last swallow of CoCo, I looked over my cup and saw her standing at my table. "Incredible," I said, not realizing I was speaking out loud. She made a double density, dual drive, 64K system look like a slide rule!

"What?" she said confusedly.

"Uh", I said, coming to my senses, "please sit down. You must be Ms. Fields."

"Holly", she purred, extending her slender hand to me as she moved smoothly into the booth.

I reached for her hand like a disk access to the last track. "What can I do for you, Holly?" I said, trying to remain calm while continuing to gently hold those long red-tipped fingers.

"It's my system. I think someone has sabotaged it." Her voice broke as the words tumbled from her beautiful lips. Big crystal tears welled up in those bottomless blue eyes.

"What do you mean, Holly?" I said while watching a diamond drop run down her flawless cheek.

She sat back quickly, wiped the tears from her eyes, and pushed long, copper-streaked,

golden waves of hair out of her face. The suddenness of her motion accented her magnificent figure. In that instant, I saw strength and resolve hidden in her innocent face.

"I mean someone is trying to keep me from doing my work. My tape files will not load and my only copies of an important program for a criminal case are on tape. I think someone is tampering with my system so I can't finish the program."

"I know this sounds like I don't believe you, but have you tried cleaning and demagnetizing the heads?" I said, trying not to sound too condescending.

"Of course I have," she frowned, "and wipe that dumb-blond look off your face. I may be a woman but I'm one of the best legal applications programmers in the country." The blue eyes turned stormy and flashed lightning.

"Sorry, Ms. Fields," I said retreatingly, "I am sure you're quite intelligent. My suggestion was, perhaps, too obvious."

"Call me Holly," she said as the lightning subsided. "I'm sorry for jumping down your throat. It's just that no one seems to take me seriously."

"Why don't we take a look at your system?" I suggested.

"That seems like a logical place to start," she smiled. Her crimson lips parted for a millisecond revealing pearly, perfect teeth.

A short drive later we arrived at her apartment in the plush Pascal Townhouses. I instinctively memorized her apartment number, 6809E, as we entered. The apartment was extremly well-appointed (like Holly) and decorated in Basic Syntax. I looked around for her system and saw none. After a few moments, she giggled and motioned me toward the bedroom. I wasn't sure at this point what she had in mind, so I nonchalantly followed her to the bedroom.

The bedroom was also like Holly: feminine and soft. She pointed to the far side of the room near the window. There sat her system: a 128K SRT-08 with dual Flexy drives, and Angelo daisy wheel printer, auto originate/-receive modem, a HiRes color monitor, and RTC-80 recorder.

She delftly brought the system up and did a CLOAD on her tape. The screen solemnly printed an "S" with a non-flashing black border. After about 10 seconds, the screen coldly displayed "I/O ERROR". She rewound and CLOADed again. This time the black-bordered "S" displayed for several seconds and an "F LEGALDEP" appeared. I started to say, "Looks OK to me," but Holly cut her eyes over her shoulder and held up one finger as if to say, "Wait." A few seconds later, the screen disintrestedly displayed "I/O ERROR."

"Something like this happens everytime," she said exasperated. "None of my tapes will load. I took the entire system to the service center and it seemed to work perfectly there. But when I got it back here, it started this I/O ERROR problem again. Maybe someone is scanning my apartment with microwaves like the Russians did the U.S. Embassy in Moscow a few years back."

Not really having any good ideas, I stalled with, "When did you first notice this problem?"

"Let's see," she mused, "I got rid of that old desk the system was on last month and bought this new System Organizer so I could get my monitor up over the keyboard. And I started having trouble...right about that same time...just after I got the new desk! Do you think there is something in the desk?" She moved cautiously away from the desk.

Still at a loss, I asked, "How was your hardware arranged on the old desk?"

"I don't see what that has to do with it," she said, "but the disks and recorders were on the left side of the desk; the computer was in the center with the modem on top; the monitor was on the right and the printer was on a stand just to the left of the desk. Why?"

"I'm not sure," I said pensively, picking up the recorder, which was sitting beside the monitor. I rewound the tape and did another CLOAD, still holding the recorder in my hand. This time the "S" came up but without a border.

"You use tapes with leaders don't you?" I asked.

"Yes," she responded, watching me closely.

A blinking black border formed around the "S". A moment later the blinking black border displayed "F LEGALDEP". The longer the "F" remained the more surprised Holly looked. Finally the program finished loading and the display offered a friendly

## A WORD FROM THE SPONSOR

Welcome to the fourth of my monthly chats with readers. Judging from my mail, this is proving to be a popular feature of our Star-Kits ads.

How often have you wished that you could see a program work before you bought it? We have come up with a way for you to do just that . . . if you have a video cassette recorder.

To show you what our programs do, we have prepared a demonstration tape which puts each of our programs through its paces so you can see exactly what it does and how. We're not professional movie producers so it's not quite up to Hollywood standards, but it does provide a complete and thorough demo of each of our programs, better than you might get in a computer store.

The tape is available in either VHS or Beta format and costs $20. If you return it, you get full credit toward any purchase. If you decide not to buy our software (not too likely once you see it work), then just erase the tape and reuse it.

Another way to evaluate products is through magazine reviews. Here is a listing of recent reviews of Star-Kits products: HUMBUG — Color Computer News in February 1983, Rainbow in May 1982, and 68 Micro Journal in June 1982. STAR-DOS — Rainbow in February 1983, and 68 Micro Journal in January 1983. SPELL'N FIX — Rainbow in July 1982, 80 Micro in November 1982, and 68 Micro Journal in July 1982. NEWTALK — Rainbow in June 1982. You will also find reviews in MICRO Magazine, InfoWorld, and elsewhere.

Here's a note to HUMBUG owners. If you are using HUMBUG with a disk system, then single-stepping or breakpointing a program may occasionally prevent Basic from turning off the disk motor. To avoid the problem, change the five bytes beginning at location 3B1A from 10 EF 8D 03 CB to A6 E4 1F 8A 12. HUMBUGs shipped after February 1, 1983 already have this change made.

One of our customers bitterly complained the other day — in fact, accused us of fraud — for shipping him Spell 'N Fix on a copy-protected disk, but not mentioning it in our ads. After taking umbrage at his letter, I decided to devote part of this column to the subject.

We all know that "lending" programs among friends is common. It's difficult to say "No" to a good friend. The problem is that some people can't even say "No" to strangers. I've recently come across a salesman in a computer store who is giving away commercial programs to total strangers just so he can sell more computers. I have also seen a computer club send out a list of "free" software by mail just so they can sign up a few more members.

Consequently, most software houses now copy-protect their disks or tapes. We do it with Spell 'N Fix, and so do most of the other major software houses that advertise in this magazine. Frankly, it costs us time and money to do it, and we don't enjoy it. Yet we have to. People who would never steal a $70 watch don't hesitate to steal a $70 program. Believe me, from the victim's point of view they both hurt equally much.

Maybe we all need a little more practice saying "No!"

After all, if God had meant to endorse this kind of thing, He would have given us the Ten Suggestions.

See you next month.

Peter A. Stark

### SPELL 'N FIX

Regardless of whose text processor you use, let SPELL 'N FIX find and fix your spelling and typing mistakes. It reads text faster than you can, and spots and corrects errors even experienced proofreaders miss. It is compatible with all Color Computer text processors, including Telewriter and Radio Shack's Scripsit! (See the review in 80 Micro, November 1982.) $69.29 in the Radio Shack disk or cassette versions; $89.29 in the Flex version. (20,000 word dictionary is standard; optional 75,000 word Super Dictionary costs $50 additional.)

### HUMBUG — THE SUPER MONITOR

A complete monitor and debugging system which lets you input programs and data into memory, list memory contents, insert multiple breakpoints, single-step, test, checksum, and compare memory contents, find data in memory, start and stop programs, upload and download, save to tape, connect the Color Computer to a terminal, printer, or remote computer, and more. HUMBUG on disk or cassette costs just $39.95.

### STAR—DOS

A Disk Operating System specially designed for the Color Computer, STAR-DOS is fully compatible with your present Color Computer disk format — it reads disks written by Extended Disk Basic and vice versa. But with STAR-DOS you can use machine and assembly language programs to do things Basic can't. Just $49.95.

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### DBLS for Data Bases

DBLS stands for Data Base Lookup System. A super-fast system for searching for a selected record in a sequential disk file. Supplied with SPELL 'N FIX's 20,000 word dictionary as a sample data file — lets you look up the spelling of any word in under FOUR seconds. Priced at $29.95. Requires STAR-DOS.

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Home accounting package combines checkbook maintenance and income tax data collection. Written in Basic for either RS Disk or Flex, $50.

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REMOTERM — allows full operation of the Color Computer from an external terminal. $19.95.

### NEWTALK

NEWTALK — a memory examine utility for machine language programmers which reads out memory contents through the TV set speaker. $20.

### SHRINK

SHRINK — our version of Eliza, in machine language and extremely fast. $15.

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"OK . Without hesitating, Holly did a "LIST". Hundreds of lines of code flashed by.

"What did you do?" she asked incredulously.

"Let's try it again," I said.

I rewound and CLOADed again, still holding the recorder. It worked again.

"I can't believe this!" she said in exasperation.

I put the recorder back next to the monitor and tried again. This time the "I/O ERROR" came up. Holly just sat watching me. I picked up the recorder again and the program loaded. I placed the recorder on the desk about a foot from the monitor. The program loaded perfectly.

Holly's eyes got very bright all of a sudden. "I know what it is!"

She threw her arms around my neck and planted a long, delicious kiss on me. I was still trying to figure out what a power transformer was, but I was not going to argue with a beautiful, intelligent woman who wanted to kiss me.

She regained her composure, looked a little embarrassed and began pouring over her code while I stood staring at her stupidly. After about a minute, without looking up, she said distractedly, "Thanks, Disk. Send me a bill, I gotta get this finished."

EPILOGUE

Two weeks later, I was hacking away on another "ULTIMATE" program. The impatient ringing of the telephone did an unconditional interrupt on my concentration.

"Winchester Detective Agency; this is Disk speaking," I said professionally, trying to hide my irritation at being interrupted.

"Mr. Winchester," said a soft sectored voice, "I need your help."

"Holly?" I said sitting bolt upright and kicking my cup of CoCo into my printer.

"Yes, I have another problem and I need your help again. I got this new program and it takes two people to run it. Will you help me?" she said with an odd giggle.

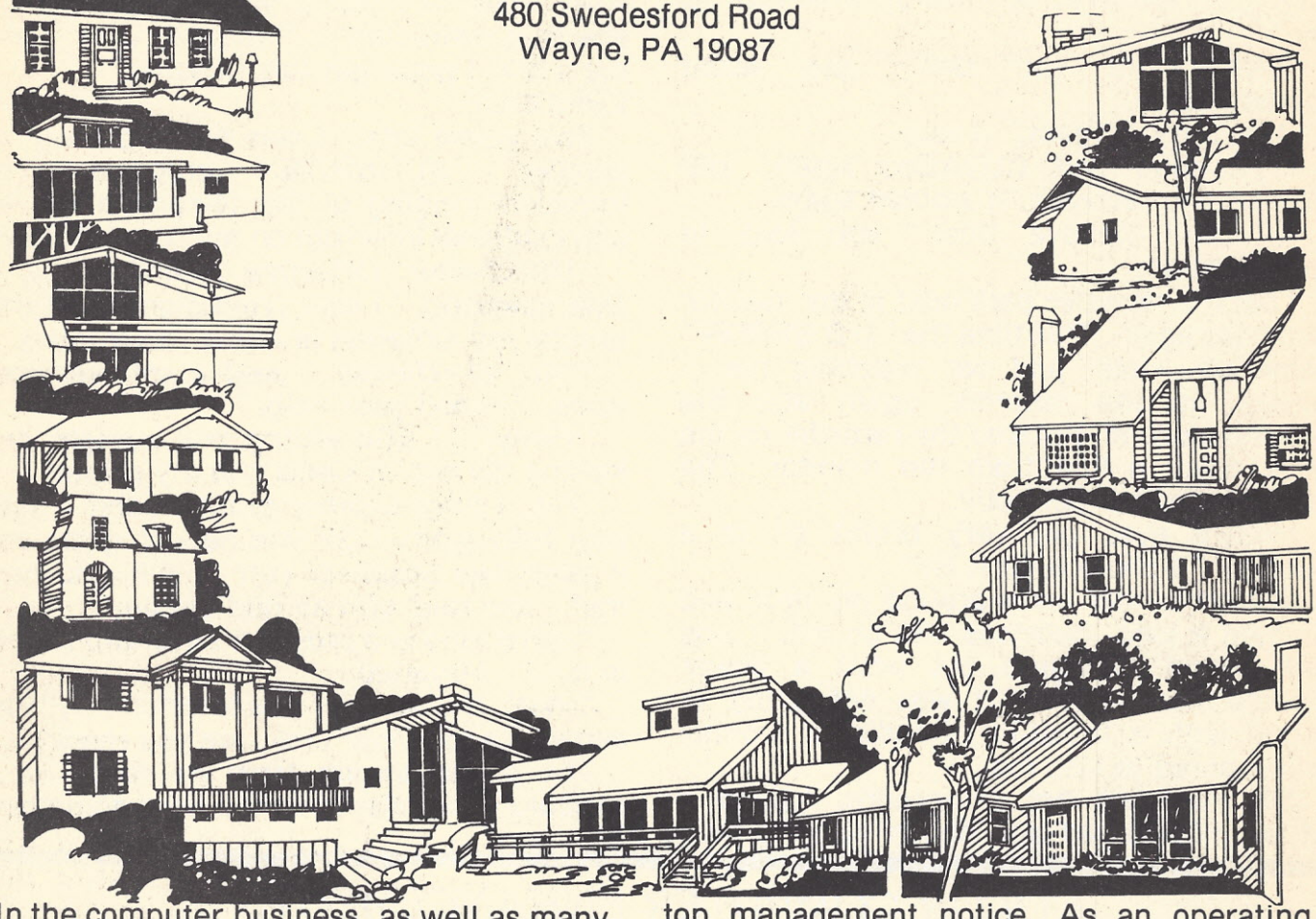
"What kind of a program takes two people to run?" I queried.

"Well, the name of it is Interlude...," she began, "and, Disk? Disk, are you there?..."

The phone swung from its cord like a pendulum as I slammed the door going out.

# CHOOSING THE BEST LEASE PROGRAM

by Larry Grady
#12 Valley Forge Executive Mail
480 Swedesford Road
Wayne, PA 19087



In the computer business, as well as many others, one is often faced with decisions regarding leasing. With computer leases one must also evaluate the impact of maintenance and future upgrades. Further, if a reasonable business decision is to be made the costs must be netted out against the estimated future revenues arising from the aquisition. The vendor (or lender) is concerned with his return on investment. In many cases he must also be convinced the investment is sound for his own security.

Often the complexity of calculating true program cost/return stands in the way of a mutually satisfactory business deal.

The following program demonstrates how the COLOR COMPUTER can handle the relatively complex problem of meeting the buyer and sellers needs.

Let's look at hypothetical situation. I as a company executive with ABC SMERF CORP recognize the need my company has for an advanced computer system. However, the need for the system is in response to a changing competative situation that has not reached the crisis stage necessary to attract top management notice. As an operating divisional VP I am acutely aware of lost business due to better pricing and shorter delivery schedules of my prime competitor. In fact, since my operation is profitable, additional operational expense now will unfavorable reflect upon my preceived management ability. I am in the classical position of having to weigh the long range benefits of an expenditure now and the potential future benefits. Can I have my cake and eat it to?

Now through the magic of the pen I am a computer account executive with ZMOST Corp. and with a hungry wife and kids to feed. I represent a company with an excellent set of hardware and software solutions. The company comptroller has set conditions for a lease that must be met in order for the company to achieve its desired rate of return. This is reflected in the company's price book lease schedule.

I know that the hardware/software solution I have for ABC SMERF CORP company is just what is required so, I put together a detailed proposal which shows the

benefits principally accruing starting 12 to 18 months in the future. I know the learning curves and implementation times will force realization of the benefits to this time frame. I also know that the cost of the level pay lease from my price book will create a very bad short term profit picture. The devil on my left shoulder says 'LOW BALL IT DUMMY' this means I should propose an unrealistically small configuration and trust the future to get the orders for the equipment that will make the system work properly. I know that this approach can get you in the door, so to speak, but it does little for my long term prospects with the customer.

I decide to be a hero, my guardian angel from the right shoulder has convinced me to lay out the correct plan and trust honesty, truthfulness and the American way I present it to ABC SMERF CORP. (see EXAMPLE I)

I now move forward in time and am now the beleaguered ABC SMERF CORP company executive evaluating the proposals with corporate management..... In summary, the best long range solution is ZMOST but we certainly can not afford the profit drain over the next 18 months. I will tell them of our decision to postpone any new system.

As a salesman I recognize the sale is made if only I can solve the short term problem. Since I postponed buying shoes for the kids and bought a color computer instead, can COCO save the day?

I get out the old text books and proceed to write the accompanying program.It produces the following schedule after trying many assumptions. (see EXAMPLE II) I take it to my comptroller and he blesses it as it provides ZMOST with the desired return. I take it to ABC SMERF CORP and walk out with signed contracts stopping by a shoe store on the way home.

Now a few words about the program and the logic behind its function.

This program has been designed to be easy to use in a 'what if' type of session. It is structured in a way to minimize the restriction of a very small screen. Some of the more sophisticated electronic spreadsheets like late releases of VISACALC® or SUPERCALC® can handle this problem but it is way beyond COLOR SPECTACULATOR® . I have a CPM version that performs essentially the same with a 80x24 CRT with a screen output like the printer output.

The program as presented can be easily adapted for a variety of applications such as income property analysis (let expected sell price be salvage value, miscellaneous be taxes etc.). For this reason I took pains to document the listing.

I usually document as much as possible within a program as most of the time I can find the program in my log file but the paper records get lost. The penalty I pay for this is long programs. If you order the CCN monthly tape from CCN MAGNA-ZINE SERVICE, Box 68, Safety Harbor, FL. 33572, (813) 797-7320 you will find two versions. One is as listed herein the other has been striped of all comments and unnecessary spaces. This version will work within a 16K extended Basic COCO. The striped version also works faster but in this program you probably won't notice.

By the way the program I used to strip is from EIGEN SYSTEMS (PO BOX 10234, AUSTIN, TEXAS). I have several products from them and all are high quality. I had a minor problem with STRIPPER and called Mark. He gave me a patch over the phone and mailed me a corrected cassette the same day. Good service for a $7 product (or any product).

I only used the strip spaces and comments option within 'THE STRIPPER' to allow editing of the striped Basic version (if you are careful) in a 16K machine. Stripper's pack lines option makes editing almost impossible. If you edit be aware ALL the spaces have been squeezed out. This means when you edit a line you must reinsert needed spaces (if tokenized form is left alone it doesn't need spaces). A space is needed after any letter variable prior to a Basic word. This is because when Basic retokenizes (see CCN Vol. 1 issue #10 page 30 Comment Corner for a discussion of tokenization.) it will think the variable includes the Basic word. For example the Basic statement (FORX=MMTORRSTEP-1) would be interpreted as (FOR X = MMTORRSTEP - 1) where the variable name (MMTORRSTEP) would yield an effective statement (FOR X = MM-1) in this case a SN error would result. This statement would

be interpreted correctly (FORX = MM TORR STEP-1). Some cases can cause subtle and hard to find errors so be careful.

In order to make program modification as easy as possible I have included a concordance listing of all line references and variables. (A good program for this purpose was published in CCN Vol. 1 #12) The concordance list should be referenced whenever a section is deleted. If you add a variable, check to insure it isn't already in use. It is also useful in finding where the variable might be changed that wasn't forgotten.

To allow more room for large data arrays you may want to eliminate all graphic memory. The procedure for this is after powering up COCO (POKE25,6:NEW), this yields about 1500 additional bytes, then load the program. Before running, remove the (PCLEAR1) command from line #14090. You may then run the program and make a copy of the modified program for future use. Use option 9 from master menu to make the copy. If you update line #00160 it will update your tape name so you may more easily tell versions apart. You must POKE and NEW each time you load, however, to get the extra memory.

I dimensioned the arrays in line #01020 to 24. Changing 'N' will allow you to make them as large as your available memory will allow. For each element added add 35 bytes.

After loading the program you will be offered a choice of using text data or entering from scratch. This I primarily used to test the program. In fact the first thing I did when writing the program was generate the test file. This is work up front which saves lots more later. It will also be useful for those of you keying in the program as TABLE I was generated from this data. It is also useful the first few times you run the program as you can get reasonable results right away then begin to play with changing the inputs a step at a time.

With the exception of changing the length of the lease or number of periods (main menu option 1) you may make entries to all columns in any order as often as you like without disturbing the others. You may also display to printer or CRT at any time to check progress.

One unusual feature is provided for most inputs. If you preceed your entry with a 'M' (like 'M5000 ENTER'). The routine will multiply it by the number of months in a period and store it. This is convenient, since often a per month figure is desired.

Another feature is the 'A' option offered for some inputs. This will add to the current period as well as all subsequent periods the amount entered and adjust subsequent periods for inflation/deflation automatically. This is useful when, for instance, you are inputting benefits. For example, when the new equipment yeilds a labor saving, that saving carries forward into subsequent periods and should also be adjusted for inflation. If an inventory reduction is achieved in a period, a one time credit for that period is in order, but don't forget the interest expense that would accrue in future years carries forward. The point is many different assumptions, best and worst case, can be quickly evaluated.

If you have a OKIDATA 82A, the print output will work as is. For most other printers, just change the control codes in line 10070. If your printer does not have 100 plus characters per line some reformatting in the 10000 line group will be necessary.

The algorithms are documented within the program. However, some additional comment is in order due to the many different treatments some basic assumptions may receive.

Lines #02020 and #02030 contain a key assumption. PR is the annual rate of return expected by the leasor. A major objective is to let the user specify the rate desired and then after inputting some fixed payments, spread the balance owed over the remaining periods while retaining the stated rate of return.

TR is the tax rate allowed for the class of investment for investment tax credit purposes. Currently 10% of computer equipment. AC is the percent of selling price the vendor capitalizes. In this model I used 40% but this will vary from company to company and from product to product. The fact a manufacturer usually will not use the sell price as the basis of his ITC calculation is the reason that in EXAMPLE II the ITC has such a impact on early cash flows. It has made many situations possible that could otherwise fall through. Be warned, however,

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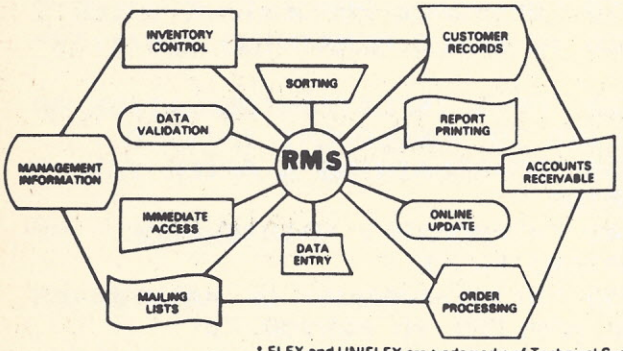


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```
10 PRINT"EXAMPLE":FORX=ATO M:FORY=STO
P:Z=X+Y:PRINTZ:NEXTY:NEXTX
```

Into this: –

```
10 PRINT "EXAMPLE":
    FOR X = A TO M:
        FOR Y = S TO P:
            Z = X + Y:
            PRINT Z:
        NEXT Y:
    NEXT X
```

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the treatment of this area is very dependant on the accounting standards used by the parties.

You may want to create a section to allow easy modification of these or other variables. For instance, I have an entry request for CV, the capitalization value claimed by the manufacturer, which in my case frequently changes. If CV is not entered the assumed value 40% is used.

The calculation of net present value, future value, inflation/deflation etc. are standard and if I have made no programming errors, should yield correct results. Which brings me up to the following. I offer this program as is and imply or state no warrantee as to its suitability to any purpose. Nor do I claim any responsibility for any result of its use.

I believe that the use of personal computers for serious business is THE coming thing. I hope this article and the program has been interesting and informative to you. I have some other models, but would like to know if others would be interested in them. Please let Bill know if you would like more.

```
100 GOTO 14090
110 '**************************CA
LCULATE BEST LEASE SCHEDULE***
120 '
130 '(C) JULY 31,1982 BY       LA
RRY GRADY
140 '999 RIDGE AVE., MANASQUAN N
J  08736
150 GOTO 1020 'START
160 TN$="LEASE7" 'REV 9/06/82
170 GOTO 14040
180 '
190 '**************************CO
NSTANTS AND VARIABLES*********
200 '
210 'CO$=CUSTOMER NAME
220 'SS$=OWNER OF INVESTMENT  TA
X CREDIT (ITC)
230 'DT=TODAYS DAY OF MONTH
240 'MO=MONTH OF YEAR
250 'YR=CURRENT YEAR '82 TO'90
260 'NY=NUMBER OF YEARS
270 'CP=CUMULATIVE PERIODS IS IN
T(NY*NP)
280 'NP=# OF PERIODS IN YEAR
290 'NM=# OF MONTHS IN PERIOD
300 'VR=VENDOR ANNUAL RETURN %
310 'PR=PERCENT RETURN DESIRED B
Y VENDOR (VR/NP) PER PERIOD
320 'IC=INITIAL EQUIPMENT COST
330 'SV= SALVAGE VALUE
340 'TC=ITC IF TO CUSTOMER IS IC
*TR*2 (USES 50% INC.TAX RATE)
350 'CV=$CAPITALIZATION VALUE IF
 ITC TO VENDOR IS IC*AC*TR*2  (U
SES 50% INCOME TAX RATE)
360 'AC=% OF EQUIPMENT SELL   PR
ICE CAPITALIZED BY VENDOR
370 '%TR=INVESTMENT TAX CREDIT
380 'MI(X)=MISCELLANEOUS CASH FL
OW FOR PERIOD 'X'
390 'ID(X)=LEASE PAYMENT
400 'IP(X)=% REMAINDER OWED TO B
E APPLIED TO PERIOD 'X'
410 'SP=SCALE PERCENTAGE VALUE U
SED TO SCALE REMAINING "IP(X)'S"

420 'MP=% INFLATION/DEFLATION AP
PLIED TO SUBSEQUENT IP(X)'S
430 'RP=REMAINING % AFTER THIS P
ERIOD
440 'MT=MONTHLY MAINTENANCE   ST
ARTING PRICE
450 'MT(X)=$AMOUNT OF MAINTEN-AN
CE APPLIED TO PERIOD 'X'
460 'MM=% INFLATION/DEFLATION AP
PLIED TO SUBSEQUENT MT(X)'S
470 'MF=%INFLATION APPLIED TO AN
NUAL MAINTENANCE
480 'RN=CURRENT SESSION RUN AT C
URRENT TABLE
490 'BE(X)=BENEFITS ACCURING  TH
IS PERIOD
500 'TP(X)=TOT.$ PRICE PERIOD 'X
'
510 'TC(X)=TOT.COST BENEFITS  LE
SS EXPENDATURES
520 'AA=FUTURE VALUE OF NET   PR
OGRAM COST/PROFIT
530 'OP=OPORTUNITY VALUE % TO CA
LCULATE AA
540 'M=FLAG TO INDICATE ENTRY IS
 MONTHLY AND MUST BE ADJUSTED TO
 PERIOD
550 'FF=USED TO INDICATE FIRST T
IME THROUGH PROGRAM BY 2500
560 'TEMPORARY VARIABLES LIST
570 'PVF,NUM,DEM,QQ,UU,VV,WW,XX,
YY,ZZ,CC,DD,I,II,II(),PE,M1,M2,X
,Y,P +SOME MISSED
580 'Q.Q$=INPUT CELL SCRATCH
590 'DERIVATION OF ALGORITHM
600 'SCALEING OF GEOMETRIC    GR
OWTH OF REMAINING PERCENT "RP"
610 'WHERE  RP=SP+(UU*SP)+    ((
```

```
UU**2)*SP)+ ... +((UU**N)*SP)
62Ø 'AND UU=1+MP   (INFLATION/DE
FLATION DECIMAL PERCENT MULTIPLY
ER)
63Ø 'AND N=CP-X+1  (NUMBER OF RE
MAINING PERIODS PLUS 1)
64Ø 'SOLVING FOR SP
65Ø 'SP=RP/(1+UU+(UU**2)+ ... +(
UU**N))
66Ø 'THE DENOMINATOR POWER    SE
RIES IS EQUIVLENT TO
67Ø '(1-(UU**(N+1)))/(1-UU)
68Ø 'DERIVATION OF LEASE PAY-
69Ø 'MENT FORMULARS
7ØØ 'PRESINT VALUE FACTOR IS  PV
F(K)=(1/(1+(I/1ØØ)))**K       FO
R ANY PERIOD K
71Ø 'NET PRESENT VALUE IS     NP
V=-CF(Ø)+SUM FROM K=1 TO N OF
        CF(K)*PVF(K)
72Ø 'THE OBJECTIVE IS TO HAVE TH
E NPV OF THE SUM OF PAYMENTS  FO
R A GIVEN INTEREST RATE =Ø
73Ø 'THEREFORE LETTING NPV=Ø  AN
D EXPANDING ABOVE YIELDS
74Ø 'CF(Ø)=PVF(1)*(P$(1))+
      PVF(2)*(P$(2))+...+
75Ø '  PVF(N-1)*(C%(N-1)*X)+
      PVF(N)*(C%(N)*X)
76Ø 'SOLVING FOR X YIELDS
77Ø 'X=NUM/-DEN WHERE
78Ø 'NUM=-CF+PVF(1)*(P$(1))+
      PVF(2)*(P$(2))+...+
79Ø '  PVF(N)*SV     WHERE P IS
 THE PAYMENT AND SV IS THE
 SALVAGE VALUE
8ØØ 'DEN=..+PVF(N-1)*(C%(N-1))
      +PVF(N)*(C%(N)     WHEREC%
 IS PERCENTAGE OF BALANCE PAID
81Ø 'THE CALCULATE ROUTINE    MA
KES TWO PASSES AT THE DATA
82Ø 'FIRST IT CALCULATES 'X'  TH
EN IT APPLIES 'X' TO FIND EACH
83Ø 'PAYMENT $AMOUNT SCALED TO T
HE PERIODS PERCENTAGE OR IT
84Ø 'USES THE FORCED $AMOUNT.
1ØØØ '
1Ø1Ø '**********************MA
IN PROGRAM START POINT********
1Ø2Ø N=24:DIM TC(N),BE(N),MT(N),
MI(N),ID(N),IP(N),TP(N)'**NOTE**
 ELEMENT (Ø) IS TOTAL CELL AND '
N' WILL DETERMINE ARRAY SIZE.
1Ø3Ø CLS3:PRINT"WELCOME TO LEASE
 OPTIMIZER TO   START OFF "
1Ø4Ø VR=.12:TR=.1 'INITIALIZE  V
ENDOR RATE OF RETURN AND ITC   R
ATE DECIMAL %
1Ø5Ø AC=.4 'AC IS THE DEFAULT  P
ERCENT OF EQUIPMENT SELL PRICE V
ENDOR CAPITALIZES FOR ITC
1Ø6Ø P1$="##,###,###":P2$="  ###
.#%  ":P3$="$###,###,###"
1Ø7Ø PRINT"DO YOU WISH SAMPLE DA
TA (Y,N)"
1Ø8Ø Q$=INKEY$:IF Q$=""THEN1Ø8Ø
1Ø9Ø IF Q$="Y"THEN PRINT:PRINT"O
K, LOADING":GOTO 11Ø3Ø ELSE 2Ø5Ø

11ØØ CLS3
1111Ø PRINT "YOU MAY CHOSE FROM"
112Ø PRINT "1 = CHANGE NUMBER OF
 PERIODS       !!NOTE THIS CLEARS
 TABLE!!"
113Ø PRINT "2 = INPUT COMPANY NA
ME & DATE"
114Ø PRINT "3 = INPUT EQUIPMENT
PRICE"
115Ø PRINT "4 = INPUT MONTHLY MA
INTANCE"
116Ø PRINT "5 = INPUT MISC CASH
FLOWS"
117Ø PRINT "6 = INPUT $OR% PERIO
D PAYMENT"
118Ø PRINT "7 = PRINT TABLE"
119Ø PRINT "8 = INPUT BENEFITS"
12ØØ PRINT "9 = MAKE COPY ON TAP
E"
121Ø PRINT"1Ø = CHANGE ITC OWNER
SHIP"
122Ø PRINT"11 = DISPLAY TABLE"
123Ø PRINT @ 448,"YOUR CHOICE PL
EASE THEN <ENTER>.";
124Ø INPUT Q
125Ø ON Q GOTO 2ØØØ,3ØØØ,4Ø3Ø,6Ø
ØØ,7ØØØ,8Ø3Ø,1Ø03Ø,12ØØØ,16Ø,4Ø6
Ø,13Ø3Ø
126Ø PRINT @ 448,"PLEASE"
127Ø CLS4:GOTO 111Ø
2ØØØ '
2Ø1Ø '**********************I
NPUT NUMBER OF YEARS AND PERIOD
2Ø2Ø '
2Ø3Ø CLS3:PRINT "CAUTION ANY DIG
IT ENTERED WILL  ERASE CURRENT T
ABLE"
2Ø4Ø PRINT"HIT ENTER TO RETURN T
O MENU     ELSE CONTINUE"
2Ø5Ø PRINT @ 16Ø,"PLEASE ENTER T
HE NUMBER OF YEARSIF 5 AND 1/2 Y
EARS DESIRED ENTER 5.5 ETC. UP T
O 9 YEARS.
2Ø6Ø INPUT Q:IF Q<1 THEN 11ØØ EL
SE IF Q>9 THEN CLS4: PRINT @ 138
,"OUT OF RANGE":GOTO 2Ø5Ø
2Ø7Ø NY=Q
```

```
2080 PRINT "INPUT PERIOD Y=YEAR,
H=HALF,      Q=QUARTERLY,M=MONTHS
"
2090 Q$=INKEY$:IF Q$="" THEN 209
0
2100 IF Q$="Y"THEN IF NY<>INT(NY
)THEN CLS4:PRINT"YEAR MUST BE IN
TERGER":GOTO 2050:ELSE NP=1:NM=1
2:GOTO 2160
2110 IF Q$="H"THEN IF(2*NY)<>INT
(2*NY)THEN CLS4:PRINT"YEAR MUST
BE MULTIPLE OF .5":GOTO 2050 ELS
E NP=2:NM=6:GOTO 2160
2120 IF Q$="Q" THEN IF 4*NY<>INT
(4*NY)THEN CLS4:PRINT "YEAR MUST
 BE MULTIPLE OF .25":GOTO 2050:E
LSE NP=4:NM=3:GOTO 2160
2130 IF Q$="M" THEN NP=12:NM=1:G
OTO 2160
2140 PRINT "PLEASE"
2150 GOTO 2080
2160 PR=VR/NP:CP=INT(NY*NP):IF F
F=0 THEN FF=1:GOTO3030 ELSE1100G
OTO 1100
3000 '
3010 '**********************INPUT
NPUT COMPANY NAME AND DATE*****
3020 '
3030 CLS3:LINE INPUT"PLEASE INPU
T COMPANY NAME";CO$
3040 INPUT"TODAYS DAY OF MONTH";
DT:IF DT<1 OR DT>31 THEN 3040
3050 INPUT"MONTH";MO:IF MO<1 OR
MO>12 THEN 3050
3060 INPUT"YEAR";YR:IF YR<82 OR
YR>90 THEN 3060
3070 GOTO1100
4000 '
4010 '**********************INPUT
NPUT EQUIPMENT INITIAL PRICE***
4020 '
4030 CLS3:INPUT"TOTAL INITIAL EQ
UIPMENT PRICE   ";IC
4040 IF IC<1 THEN PRINT "INPUT E
RROR":GOTO 4030
4050 INPUT"SALVAGE VALUE";SV
4060 PRINT"VENDOR TO RECEIVE ITC
 (Y,N)?"
4070 Q$=INKEY$:IF Q$="" THEN 407
0
4080 IF Q$="Y" THEN INPUT"VENDOR
 CAPATILIZATION VALUE OR  ENTER
0 IF UNKNOWN";Q ELSE 4110
4090 IF Q=0 THEN CV=IC*AC*TR*2 E
LSE CV=Q*TR*2
4100 TC=0:SS$="VENDOR":GOTO 1100

4110 IF Q$="N" THEN TC=IC*TR*2:C
V=0:SS$=CO$:GOTO 1100
4120 CLS4:PRINT"PLEASE ENTER ":G
OTO 4060
5000 '
5010 '**********************SB
R TO CALCULATE PERCENTAGES   A
DJUSTED BY INFLATION/DEFLATION
5020 'RETURN REMAINING'IP(X)'S'
5030 '
5040 MP=Q/(NP*100)
5050 UU=MP+1:VV=1
5060 SP=-RP/((1-EXP(LOG(UU)*(CP-
X+1)))/MP)
5070 FOR X=X TO CP:ID(X)=0:IP(X)
=VV*SP:VV=VV*UU:RP=RP-IP(X):NEXT
 X
5080 WW=0:FOR X=1 TO CP:PRINTIP(
X),ID(X),:WW=WW+IP(X):NEXT X
5090 PRINT WW:INPUT"PRESS ENTER
TO CONTINUE";QQ:RETURN
6000 '
6010 '**********************I
NPUT MONTHLY MAINTENANCE AND  E
XPECTED ANNUAL INFLATION % ****
6020 '
6030 CLS3
6040 INPUT"MONTHLY MAINTANCE";MT
:IF MT=0 THEN 1100 ELSE IF MT<9
THEN 6040
6050 INPUT"EXPECTED AVERAGE YEAR
LY          INFLATION/DEFLATION";
MM:IF MM<-200 OR MM>200 THEN 605
0
6060 MT(0)=0:IF MM=0 THEN FOR X=
1 TO CP:MT(X)=MT*NM:MT(0)=MT(0)+
MT(X):NEXTX:GOTO 1100
6070 QQ=1+(MM/100):UU=1:VV=NP
6080 FOR X=1 TO CP:MT(X)=MT*UU*N
M:MT(0)=MT(0)+MT(X)
6090 VV=VV-1:IF VV<1 THEN VV=NP:
UU=UU*QQ
6100 NEXT X
6110 CLS3:FOR X=1 TO CP:PRINT US
ING"$$###,###,###    ";MT(X);:NEX
TX:PRINT:PRINT USING P3$;MT(0)
6120 INPUT"PRESS ENTER TO RETURN
 TO MENU";Q:GOTO1100
7000 '
7010 '**********************I
NPUT MISC CASH FLOWS FOR PERIOD
NOT INCLUDED IN LEASE *********
7020 '
7030 FOR X=1TO CP
7040 GOSUB 7060
7050 NEXTX:GOSUB 7330:GOTO 1100
7060 CLS3:PRINTUSING"PERIOD ## C
URRENTLY $###,###,###DO YOU WISH
 TO CHANGE?";X,MI(X)
```

```
7070 PRINT"TO ENTER MISC CASH FL
OWS ENTER"
7080 PRINT"A LETTER FOLLOWED BY
AN AMOUNT  'S' SKIP THIS PERIOD"

7090 PRINT"'O' ONE TIME ENTRY
          'A' ADD THIS AMT TO B
AL OF CF'S 'R' TO RETURN TO MENU
"
7100 PRINT"'N' NEW REPLACE CURRE
NT VALUE   'C' CLEAR COL."
7110 PRINT"IF 'M' FOLLOWS THEN A
MT ENTERED IS ASSUMED MONTHLY AN
D ADJUSTED"
7120 Q$=INKEY$:IF Q$="" THEN 712
0 ELSE PRINT Q$
7130 IF Q$="S" THEN RETURN
7140 IF Q$="O" THEN GOSUB 7210:M
I(X)=MI(X)+Q:RETURN
7150 IF Q$="A" THEN GOSUB 7210:G
OTO 7280
7160 IF Q$="R" THEN X=CP:RETURN
7170 IF Q$="N" THEN GOSUB 7210:M
I(X)=Q:RETURN
7180 IF Q$="C" THEN FOR X=0 TO C
P:MI(X)=0:NEXT X:X=0:RETURN
7190 CLS4:PRINT"PLEASE ENTER S,O
,A,R,N,C  ONLY":GOTO 7080
7200 '**********************5
BR TO ADJUST MONTH TO PERIOD
7210 Q$=INKEY$:IF Q$=""THEN7210
ELSE PRINT Q$;
7220 IF Q$="M"THENM=1:Q$=""ELSE
M=0
7230 QQ$=INKEY$:IF QQ$="" THEN 7
230 ELSEIF QQ$=CHR$(13)THEN7250
7240 Q$=Q$+QQ$:PRINT QQ$;:GOTO 7
230
7250 Q=VAL(Q$)
7260 IF M=1 THEN Q=Q*NM
7270 RETURN
7280 PRINT:INPUT"INFLATION RATE
FOR THIS PERIOD";M1:IF M1<-200 O
R M1>200 THEN 7280
7290 IF M1=0 THENFOR VV=X TO CP:
MI(VV)=MI(VV)+Q:NEXT VV:RETURN
7300 QQ=1+(M1/(100*NP)):UU=1:VV=
NP
7310 FOR ZZ=X TO CP:MI(ZZ)=MI(ZZ
)+(Q*UU):VV=VV-1:IF VV<1 THENVV=
NP:UU=UU*QQ
7320 NEXT ZZ:RETURN
7330 'SBR TO CALCULATE 'MI(0)' T
OTAL OF MISC. COL.
7340 MI(0)=0:FOR VV=1 TO CP:PRIN
T USING"###  ##,###,### ";VV,MI(
VV);:MI(0)=MI(0)+MI(VV):NEXT VV
7350 PRINT:PRINT USING"TOTAL ##,
```

```
###,###";MI(Ø)
7360 INPUT"PRESS <ENTER> TO CONT
INUE";Q
7370 RETURN
8000 '
8010 '*************************I
NPUT PAYMENT$ OR % TO APPLY TO B
ALANCE OWED ON LEASE***********
8020 '
8030 RP=1:UU=Ø:FOR X=1 TO CP
8040 GOSUB 8060
8050 NEXT X:GOTO 1100
8060 'SBR TO INPUT PERIOD $/%
8070 CLS3
8080 IF IP(X)=ØTHEN PRINTUSING"#
# CURRENTLY $##,###,### DO YOU
WISH TO CHANGE ?";X,ID(X):GOTO 8
100
8090 PRINTUSING"## CURRENTLY ##.
##% DO YOU WISH TO CHANGE ?";X,I
P(X)*100
8100 PRINT"TO ENTER YOU MAY CHOO
SE EITHER  'F' FORCE DOLLAR AMOU
NT AS TOTAL     FOR PERIOD."
8110 PRINT"'P' % FOR THIS PERIOD
 ONLY"
8120 PRINT"'I' THEN <ENTER> INFL
ATION RATE OR 'Ø' FOR NONE TO SP
READ        REMAINING PAYMENTS BA
LANCE"
8130 PRINT"'S' TO SKIP THE PERIO
D"
8140 PRINT"'C' TO CLEAR TABLE"
8150 Q$=INKEY$:IF Q$="" THEN 815
Ø ELSE PRINTQ$
8160 IF Q$="F" THEN 8230
8170 IF Q$="P" THEN 8250
8180 IF Q$="I" THEN 8270
8190 IF Q$="S" THEN 8290
8200 IF Q$="C"THEN FOR I=1 TO CP
:ID(I)=Ø:IP(I)=Ø:NEXT I:X=Ø:RETU
RN
8210 IF Q$="R" THEN X=CP:RETURN
8220 CLS4:PRINT"INPUT F,P,I, OR
R FOR MENU":GOTO 8080
8230 IF(IP(X)=Ø AND UU=Ø) THEN G
OSUB 7210:ID(X)=Q:RETURN
8240 CLS4:PRINT"YOU MUST ENTER A
% AFTER ONE HAS BEEN ENTERED PRE
VIOUSLY, PLEASE":GOTO 8080
8250 GOSUB 7210:Q=Q/100:IF(Q<>Ø
AND Q<RP) THEN IP(X)=Q:ID(X)=Ø:R
P=RP-Q:UU=1:RETURN
8260 CLS4:PRINT"YOU MUST ENTER A
 NON ZERO VALUE OR VALUE ENTERED
 TOO LARGEPLEASE":GOTO 8080
8270 GOSUB7210:IF Q<>ØTHEN 8320
8280 YY=RP/(CP-X+1):FOR X=X TO C
P:IP(X)=YY:ID(X)=Ø:NEXTX:RETURN
8290 IF IP(X)<>ØTHENRP=RP-IP(X):
ID(X)=Ø:RETURN
8300 IF ID(X)<>Ø THEN RETURN
8310 CLS4:PRINT "YOU MUST ENTER
A DOLLAR OR %,   PLEASE ":GOTO 8
080
8320 IF (Q<-200 OR Q>200) THEN P
RINT"INFLATION FACTOR OUT OF RAN
GE   OF -200% TO 200%,PLEASE ":G
OTO 8080
8330 GOTO 5040:
9000 '
9010 '*************************S
BR TO CALCULATE TABLE *********
9020 '
9030 CLS3:PRINT"CALCULATING":FOR
 X=Ø TO CP
9040 TP(X)=Ø:TC(X)=Ø
9050 NEXT X
9060 NUM=-(IC-CV):DEN=Ø
9070 PVF=1/(1+PR):VV=PVF
9080 FOR X=1 TO CP
9090 IFX=CP THENNUM=NUM+(VV*SV)
9100 IF IP(X)=Ø THEN 9120
9110 DEN=DEN+(VV*IP(X)):GOTO 913
Ø
9120 NUM=NUM+(VV*ID(X))
9130 VV=VV*PVF
9140 NEXT X
9150 XX=NUM/(-DEN)
9160 MT(Ø)=Ø:MI(Ø)=Ø:IP(Ø)=Ø:ID(
Ø)=Ø:FOR X=1 TO CP
9170 IF X=1 THEN TC(X)=TC
9180 IF IP(X)=Ø THEN 9200
9190 ID(X)=XX*IP(X)
9200 ID(Ø)=ID(Ø)+ID(X)
9210 TP(X)=MI(X)+ID(X)+MT(X)
9220 TC(X)=TC(X)+BE(X)-TP(X)
9230 TC(Ø)=TC(Ø)+TC(X)
9240 TP(Ø)=TP(Ø)+TP(X)
9250 IP(Ø)=IP(Ø)+IP(X)
9260 MI(Ø)=MI(Ø)+MI(X)
9270 MT(Ø)=MT(Ø)+MT(X)
9280 NEXT X
9290 '***TO CALCULATE FUTURE $ V
ALUE OF NET COST/GAIN
9300 AA=Ø:CC=1+(OP/NP):DD=1
9310 FOR Z=CP TO 1 STEP-1:AA=AA+
(TC(Z)*DD):DD=DD*CC:NEXTZ
9320 RETURN
10000 '
10010 '*************************
PRINT OUTPUT FORMATED TO PRINTER

10020 '
10030 INPUT"TURN ON PRINTER, ENT
ER WHEN ON";Q
```

Sugar Software

# AUTO RUN

Auto Run is a utility program for the TRS-80* Extended Basic Color Computer. It is used to add convenience and professionalism to your software.

Auto Run will help you create your title screen with the graphics editor. The graphics editor allows you to choose a background color and border style. Using the arrow keys and several other commands you can draw pictures, block letters and also include text.

Auto Run will generate a machine language loader program to preceed your program on the tape. Then, to start up your program, simply type CLOADM to load in the Auto Run loader program, which will then automatically start itself up, display your title screen, load your program and then RUN or EXEC it.

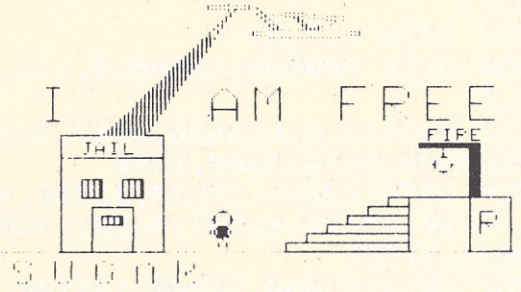
Also you may record a vocal or musical introduction preceding your program. The Auto Run loader will control the audio on/off.

Basic programs can be set to load anywhere in memory above $600 (the PCLEAR 0 page).

Software authors: The Auto Run prefix may be appended to your software products.

Auto Run is **$14.95** and includes complete documentation and an assembly source listing.
Requires 16K Extended Basic.

# Galactic Hangman




A great new twist to the popular, educational word guessing game for the Color Computer. Large (700 words) and sophisticated vocabulary. Or enter your own words, your child's spelling list, foreign language vocabulary, etc.

Outstanding high resolution graphics, animation and sound effects.

For **$14.95** you get both the 16K and 32K versions of Galactic Hangman.

# TIMS

## Tape Information Management System

A user-oriented, easy to use personal database management system for the TRS-80* Color Computer with these outstanding features:

* keeps files of programs, names, addresses, birthdays, recipes, class or club rosters, anything
* variable record and field lengths
* phrase substitution editor
* up to 8 user-definable fields
* ML sort (up to 3 fields), search and delete functions
* 2 search modes — range and item
* user-definable printer format, for any printer
* up to 230 characters per record

For **$24.95** you get the database management system, our full documentation which includes a reference guide and a programmer's guide, and our 1981 Bibliography of articles relating to the Color Computer. Requires 16K Extended Basic. 32K recommended.

**1982 TIMS Bibliography — $9.95**

# Silly Syntax


A sensational and educational version of a popular party game for the TRS-80* Color Computer . . .

For 1 to 10 players. Load a story into the computer. The players are asked to supply a noun, verb, part of body, celebrity, etc. which the program uses to complete the story. The story, which is displayed when all words are entered, will be hilarious. Silly Syntax requires 16K Extended Basic (32K for disk version). For **$19.95,** you get a user guide and a tape containing the Silly Syntax game and 2 stories. You can create your own stories or order story tapes from the selection below.

**Silly Syntax stories — Ten stories per tape.**

| | |
|---|---|
| SS-001 - Fairy Tales | SS-004 - Current Events |
| SS-002 - Sing Along | SS-006 - Adventure/Sci-Fi |
| SS-003 - X-Rated | SS-007 - Potpourri |

Each story tape is **$9.95**. 10% off for 3 or more story tapes. Disk is **$24.95** for Silly Syntax and 2 stories or **$49.95** for Silly Syntax and all 62 stories.

RAINBOW CERTIFICATION SEAL

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**(614) 861-0565**
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Add $1.00 per tape or disk for postage and handling. Ohioans add 5.5% sales tax. COD orders are welcome. Dealer inquiries invited.

```
10040 GOSUB 9010 'CALCULATE
10050 CLS:PRINT"PRINTING NOW"
10060 'THE FOLLOWING ARE STRINGS
TO FORMAT A OKIDATA 82A FOR
NARROW MODE AND 16.5 CPI,1200BD
10070 POKE150,41:PRINT#-2,CHR$(1
7);CHR$(24);CHR$(27);CHR$(54);CH
R$(27);CHR$(66);CHR$(29)
10080 RN=RN+1
10090 PRINT#-2,USING"
     LEASE PLAN FOR %
                                %";
CO$
10100 PRINT#-2," "
10110 PRINT#-2," "
10120 PRINT#-2,USING"FOR #.# YEA
RS OF ## PERIODS OF ## MONTHS";N
Y,NP,NM
10130 PRINT#-2," "
10140 PRINT#-2,USING"INITIAL EQU
IPMENT VALUE $##,###,### WITH SA
LVAGE VALUE $##,###,### ";IC,SV;

10150 PRINT#-2, USING"AFTER TAX
ITC OF $#,###,### TO %       %";T
C+CV,SS$
10160 IF MT=0 THEN 10180
10170 PRINT#-2,USING"INITIAL MON
THLY MAINT    $$###,### AT +##.#
PCT/YEAR  INFLATION";MT,MM
10180 PRINT#-2," "
10190 PRINT#-2," "
10200 PRINT#-2,"         PERIOD
"; '16 SPACES
10210 PRINT#-2,"BUDGET$MUST  ";
'13 SPACES
10220 PRINT#-2,"%REMAINDER  "; '
12 SPACES
10230 IF MI(0)<>0 THEN PRINT#-2,
"MISC CF$  "; '10 SPACES
10240 IF MT <>0 THEN PRINT#-2,"M
AINTANCE$ "; '12 SPACES
10250 PRINT#-2," TOT$/PERIOD  MO
NTHLY"; '24 SPACES
10260 PRINT#-2,"  $ BENEFITS  NE
T COST"; '22 SPACES
10270 PRINT#-2," "
10280 BE(0)=0:FOR X=1 TO CP:II=T
P(X)/NM:GOSUB 10300:BE(0)=BE(0)+
PE
10290 NEXT X:GOTO 10380
10300 PRINT#-2,USING"          ##
     ";X;'SBR TO PRINT MAIN TABL
E LINE
10310 PRINT#-2,USING"##,###,###
###.##   ";ID(X),IP(X)*100;

10320 IF MI(0)<>0 THEN PRINT#-2,
USING"###,###    ";MI(X);
10330 IF MT<>0 THEN PRINT#-2,USI
NG"#,###,###";MT(X);
10340 PRINT#-2,USING"  ##,###,##
#    #,###,###";TP(X),II;
10350 IF X=1 THEN PE=BE(X)+TC EL
SE PE=BE(X)
10360 PRINT#-2,USING"##,###,###
 ##,###,###";PE,TC(X)
10370 RETURN
10380 PRINT#-2," "
10390 II=0:X=0:PRINT#-2,"
 TOTAL    ";:GOSUB 10310
10400 PRINT#-2,USING"AVERAGE MON
THLY COST $$#,###,###";TP(0)/(CP
*NM)
10410 PRINT#-2," "
10420 PRINT#-2," "
10430 PRINT#-2,USING"NET PROGRAM
 FUTURE VALUE $$###,###,### USEIN
G ##.#% OPORTUNITY RATE.";AA,OP*
100
10440 PRINT#-2," "
10450 PRINT#-2,USING"           #
#/##/## RUN NUMBER ###.###";MO,D
T,YR,RN+VR
10460 PRINT#-2,CHR$(12)
10470 GOTO1100
11000 '
11010 '************************
LOAD INITIAL TEST DATA *********

11020 '
11030 DATA"ABC SMERF CORP.",5.5,
2,6,11
11040 DATA 1,1,82
11050 DATA 900000,72000,0,.15,90
000,5
11060 DATA 0,0,0,3600,3600,3600,
3600,5600,5600,5600,5600
11070 DATA 40200,40200,42210,422
10,44320,44320,46537,46537,48863
,48863,51307
11080 DATA 22000,66000,142000,16
8000,194000,223000,260000,280000
,293000,298000,312000
11090 READ CO$,NY,NP,NM,CP
11100 READ DT,MO,YR
11110 READ IC,CV,TC,OP,SV,MM
11120 FOR Z=1 TO CP:READ MI(Z):N
EXTZ
11130 SS$="VENDOR":PR=VR/NP
11140 FOR Z=1 TO 11:READ MT(Z):N
EXT Z
11150 FOR Z=1 TO 11:READ BE(Z):I
D(Z)=.07364:IP(Z)=.090999:NEXT Z:
MT=MT(1)/NM
11160 GOTO1100
```

```
12000 '
12010 '************************
INPUT BENEFITS FOR EACH PERIOD *

12020 '
12030 FOR X=1 TO CP
12040 GOSUB 12080
12050 NEXT X:GOSUB 12280
12060 PRINT:PRINT"ENTER OPORTUNI
TY VALUE IN % FOR":PRINT CO$:PRI
NT"(REINVESTMENT RATE)"
12070 INPUT OP:OP=OP/100:GOTO 11
00
12080 CLS3:PRINTUSING"PERIOD ##
CURRENTLY $###,###,###DO YOU WIS
H TO CHANGE?";X,BE(X)
12090 PRINT"ENTER BENEFITS FOR P
ERIOD"
12100 PRINT"A LETTER FOLLOWED BY
 AN AMOUNT  'S' SKIP THIS PERIOD
"
12110 PRINT"'O' ONE TIME ENTRY
           'A' ADD THIS AMT TO
BAL OF CF'S 'R' TO RETURN TO MEN
U"
12120 PRINT"'N' NEW REPLACE CURR
ENT VALUE   'C' CLEAR COL."
12130 PRINT"IF 'M' FOLLOWS THEN
AMT ENTERED IS ASSUMED MONTHLY A
ND ADJUSTED"
12140 Q$=INKEY$:IF Q$="" THEN 12
140 ELSE PRINT Q$
12150 IF Q$="S" THEN RETURN
12160 IF Q$="O" THEN GOSUB 7210:
BE(X)=BE(X)+Q:RETURN
12170 IF Q$="A" THEN GOSUB 7210:
GOTO 12220
12180 IF Q$="R" THEN X=CP:RETURN

12190 IF Q$="N" THEN GOSUB 7210:
BE(X)=Q:RETURN
12200 IF Q$="C" THEN FOR Z=0 TO
CP:BE(Z)=0:NEXT Z:X=0:RETURN
12210 CLS4:PRINT"PLEASE ENTER S,
O,A,R,N,C  ONLY":GOTO 12090
12220 PRINT:INPUT"INFLATION RATE
 FOR THIS PERIOD";M2:IF M2<-200
OR M2>200 THEN 12220
12230 IF M2=0 THEN FOR VV=X TO C
P:BE(VV)=BE(VV)+Q:NEXT VV:RETURN

12240 QQ=1+(M2/(100*NP)):UU=1:VV
=NP
12250 FOR ZZ=X TO CP:BE(ZZ)=BE(Z
Z)+(Q*UU):VV=VV-1:IF VV<1 THEN V
V=NP:UU=UU*QQ
12260 NEXT ZZ:RETURN
12270 'SBR TO CALCULATE 'BE(0)'
TOTAL OF MISC. COL.
12280 BE(0)=0:FOR VV=1 TO CP:PRI
NT USING"###  ##,###,### ";VV,BE
(VV);:BE(0)=BE(0)+BE(VV):NEXT VV

12290 PRINT:PRINT USING"TOTAL ##
,###,###";BE(0)
12300 INPUT"PRESS <ENTER> TO CON
TINUE";Q
12310 RETURN
13000 '
13010 '************************
DISPLAY TABLE ******************

13020 '
13030 GOSUB 9030
13040 CLS3:PRINT"SELECT ANY THRE
E COLUMNS":PRINT
13050 PRINT"1 = LEASE PAYMENT(BU
DGET MUST"
13060 PRINT"2 = PERCENTAGE OF RE
MAINDER"
13070 PRINT"3 = MAINTANCE"
13080 PRINT"4 = MISC. PAYMENTS "

13090 PRINT"5 = TOTAL PAYMENTS F
OR PERIOD"
13100 PRINT"6 = MONTHLY PAYMENTS
"
13110 PRINT"7 = BENEFITS FROM EX
PENDATURE"
13120 PRINT"8 = NET COST"
13130 PRINT"OR SELECT SUMARY DAT
A = 9"
13140 PRINT"OR RETURN TO MAIN ME
NU = 10"
13150 PRINT@448,"YOUR SELECTIONS
 PLEASE X,Y,Z"
13160 INPUT YY(0),YY(1),YY(2)
13170 IF YY(0)=9 THEN 13430
13180 IF YY(0)=10 THEN 1100
13190 F1=0:FOR I=0 TO 2
13200 II(I)=0:IF YY(I)<1 OR YY(I
)>8 THEN F1=1:I=2
13210 NEXT I:IF F1=1 THEN 13030
13220 FOR XX=1 TO CP
13230 PRINT USING"##";XX;
13240 FOR ZZ=0 TO 2:P$=P1$:F1(ZZ
)=0
13250 ON YY(ZZ) GOSUB 13340,1335
0,13360,13370,13380,13400,13390,
13410
13260 PRINT USING P$;P;:IF F1(ZZ
)=0 THEN II(ZZ)=II(ZZ)+P
13270 NEXT ZZ
13280 NEXT XX
13290 PRINT "T ";
13300 FOR I=0 TO 2
```

```
13310 IF YY(I)=2 THEN PRINTUSING
 P2$;II(I);ELSE PRINT USING P1$;
II(I);
13320 NEXT I
13330 INPUT"HIT ENTER TO CONTINU
E";Q:GOTO 13040
13340 P=ID(XX):RETURN
13350 P=IP(XX)*100:P$=P2$:RETURN
13360 P=MT(XX):RETURN
13370 P=MI(XX):RETURN
13380 P=ID(XX)+MT(XX)+MI(XX):RET
URN
13390 IF XX=1 THEN P=BE(XX)+TC E
LSE P=BE(XX):RETURN
13400 P=(ID(XX)+MT(XX)+MI(XX))/N
M:F1(ZZ)=1:RETURN
13410 IF XX=1 THEN P=BE(XX)+TC E
LSE P=BE(XX)
13420 P=P-(ID(XX)+MT(XX)+MI(XX))
:RETURN
13430 CLS3:PRINT"         BEST LEA
SE PLAN FOR"
13440 PRINT USING"         %
              %";CO$
13450 PRINT" "
13460 PRINT USING"FOR #.# YRS OF
 ## PERIODS EACH";NY,NP
13470 PRINT"EQUIPMENT INITIAL CO
ST"
13480 PRINT USING"             $$##
,###,###";IC
13490 PRINT USING"SALVAGE VALUE
$##,###,###";SV
13500 PRINT"INVESTMENT TAX CREDI
T OF"
13510 PRINT USING"$$##,###,### T
O %                %";CV+TC,SS$;
13520 PRINT"TOTAL PROGRAM FUTURE
 VALUE"
13530 PRINT USING"$$##,###,### A
T ###.#%";AA,OP*100
13540 PRINT"OPORTUNITY RATE"
13550 PRINT USING"DATE ##/##/##
RUN NUMBER ###.###";MO,DT,YR,RN+
VR
13560 PRINT USING"AVERAG MONTHLY
 PMT $$##,###,###";TP(0)/(CP*NM)
13570 INPUT"PRESS ENTER TO CONTI
NUE.";Q
13580 GOTO 13040
14000 '
14010 '************************
HOUSEKEEPING*********************
14020 '
14030 'CASSETT SAVE PROGRAM(2COP
IES)NAME FROM 370
14040 CLS3:PRINT"LOAD TAPE PRESS
 PLAY & RECORD   HIT ENTER":INPU
TQ
14050 FOR Y=1 TO 2:AUDIOON:MOTOR
ON:FORZ=0TO999:NEXTZ:CSAVE TN$:N
EXTY
14060 GOTO 1100
14070 'SET GRAPHICS MEMORY TO 1
 PAGE NEXT INST.MUST BE LAST
14080 'DELETE THE PCLEAR IF YOU
POKE 25,6:NEW AFTER TURNING COCO
 ON PRIOR TO LOADING TAPE*******
14090 PCLEAR1:GOTO 110
14100 '*******END***************
*
```

## COMMENTS FOR EXAMPLE I

EXAMPLE I demonstrates a typical lease situation. The columns are interpreted as follows. #1 shows the period number in this example there are 11 periods of 6 months each. #2 Shows the lease payment which in this case will yield to ZMOST 12% per year on the sell price of $900.000, ZMOST will take The Investment Tax Credit (ITC) and salvage the equipment for an estimated $90,000 at the end of 5 years. #3 Is the percent of the present value and inputted interest applied to this period. #4 Is for miscellaneous payments in this case upgrades to the base system for planned growth. #5 Is the maintenance paid in the period in this case adjusted for 5% per year inflation. #6 Is the sum of #2, #3, #4 and #7 is #6 divided by the number of months in a period in this case 6 yielding the monthly payment to ZMOST. #8 Is a summary of the estimated dollar benefits accruing as a result of the use of the equipment. Normally any start up expenses such as education would be netted within this column. #9 might be better headed net program gain/loss. It is column #8 less #6. The values in this column are future valued with an assumed opportunity rate of 15% in this example. This value is printed as 'net program future value' and is a means of weighing one program opportunity or lease plan against another. If you key in the program correctly you will get this table as the data for it is part of the program.

*COLOR COMPUTER NEWS TIP*

To disable ROM pack POKE 65315,54 then insert ROM pack. To execute POKE 65315,55 or EXEC&HC000.

```
                LEASE PLAN FOR ABC SMERF CORP.


FOR 5.5 YEARS OF  2 PERIODS OF  6 MONTHS

INITIAL EQUIPMENT VALUE $  300,000 WITH SALVAGE VALUE $   90,000 AFTER TAX ITC OF $  180,000 TO ABC SMER
INITIAL MONTHLY MAINT      $6,700 AT  +5.0 PCT/YEAR  INFLATION


 PERIOD  BUDGET$MUST  %REMAINDER  MISC CF$  MAINTANCE$  TOT$/PERIOD  MONTHLY  $ BENEFITS  NET COST
      1      140,000       0.00         0      40,200      180,200   30,033     202,000    21,800
      2       15,000       0.00         0      40,200       55,200    9,200      66,000    10,800
      3       80,000       0.00         0      42,210      122,210   20,368     142,000    19,790
      4      104,379      10.47     3,600      42,210      150,189   25,032     168,000    17,811
      5      109,598      11.00     3,600      44,320      157,518   26,253     194,000    36,482
      6      115,078      11.55     3,600      44,320      162,998   27,166     223,000    60,002
      7      120,832      12.12     3,600      46,537      170,969   28,495     260,000    89,031
      8      126,874      12.73     5,600      46,537      179,011   29,835     280,000   100,989
      9      133,218      13.37     5,600      48,863      187,681   31,280     293,000   105,319
     10      139,878      14.03     5,600      48,863      194,341   32,390     298,000   103,659
     11      146,872      14.74     5,600      51,307      203,779   33,963     312,000   108,221

  TOTAL    1,231,731     100.00    36,800     495,567    1,764,098         0 2,438,000   673,902
AVERAGE MONTHLY COST     $26,729

NET PROGRAM FUTURE VALUE     $858,642 USEING 15.0% OPORTUNITY RATE.
    1/ 1/82 RUN NUMBER   3.120
```

## COMMENTS FOR EXAMPLE II

EXAMPLE II shows the result of trying several different leasing strategies. The cost of equipment and the interest rates have not been changed but note the net cost column. It does not show any loss for any period, our intrepid VP at ABC has had his cake and saved it too! One big item was passing the ITC to ABC since it is worth much more to them. An effect of this was for ZMOST to add to its sell price the ITC it would have taken. This is why total #2 is a lot more in this case vrs EXAMPLE I. Another difference is in the lease payment schedual #2. Note we forced the initial 3 values to maintain a relatively constant pay back. Values for period 4 on were scaled using some inflation. The yield to ZMOST is still their desired 12% Note also period 1 benefits column #8 That is where the ITC to ABC has been put. It is the $22,000 from EXAMPLE I plus the ITC of $180,000. EXAMPLE II is also more profitable to ABC as seen by a net future value of $858,642 vrs $621,166 in EXAMPLE I. These models are useful in evaluating a number of situations if one changes the names of things.

LEASE PLAN FOR ABC SMERF CORP.

FOR 5.5 YEARS OF 2 PERIODS OF 6 MONTHS

INITIAL EQUIPMENT VALUE $ 900,000 WITH SALVAGE VALUE $ 90,000 AFTER TAX ITC OF $ 72,000 TO VENDOR
INITIAL MONTHLY MAINT $6,700 AT +5.0 PCT/YEAR INFLATION

| PERIOD | BUDGET$MUST | %REMAINDER | MISC CF$ | MAINTANCE$ | TOT$/PERIOD | MONTHLY | $ BENEFITS | NET COST |
|---|---|---|---|---|---|---|---|---|
| 1 | 98,973 | 9.10 | 0 | 40,200 | 139,173 | 23,196 | 22,000 | -117,173 |
| 2 | 98,973 | 9.10 | 0 | 40,200 | 139,173 | 23,196 | 66,000 | -73,173 |
| 3 | 98,973 | 9.10 | 0 | 42,210 | 141,183 | 23,531 | 142,000 | 817 |
| 4 | 98,973 | 9.10 | 3,600 | 42,210 | 144,783 | 24,131 | 168,000 | 23,217 |
| 5 | 98,973 | 9.10 | 3,600 | 44,320 | 146,893 | 24,482 | 194,000 | 47,107 |
| 6 | 98,973 | 9.10 | 3,600 | 44,320 | 146,893 | 24,482 | 223,000 | 76,107 |
| 7 | 98,973 | 9.10 | 3,600 | 46,537 | 149,110 | 24,852 | 260,000 | 110,890 |
| 8 | 98,973 | 9.10 | 5,600 | 46,537 | 151,110 | 25,185 | 280,000 | 128,890 |
| 9 | 98,973 | 9.10 | 5,600 | 48,863 | 153,436 | 25,573 | 293,000 | 139,564 |
| 10 | 98,973 | 9.10 | 5,600 | 48,863 | 153,436 | 25,573 | 298,000 | 144,564 |
| 11 | 98,973 | 9.10 | 5,600 | 51,307 | 155,880 | 25,980 | 312,000 | 156,120 |
| TOTAL | 1,088,705 | 100.10 | 36,800 | 495,567 | 1,621,072 | 0 | 2,258,000 | 636,928 |

AVERAGE MONTHLY COST $24,562

NET PROGRAM FUTURE VALUE $621,166 USEING 15.0% OPORTUNITY RATE.

1/ 1/82 RUN NUMBER 1.120

# 80-U.S.

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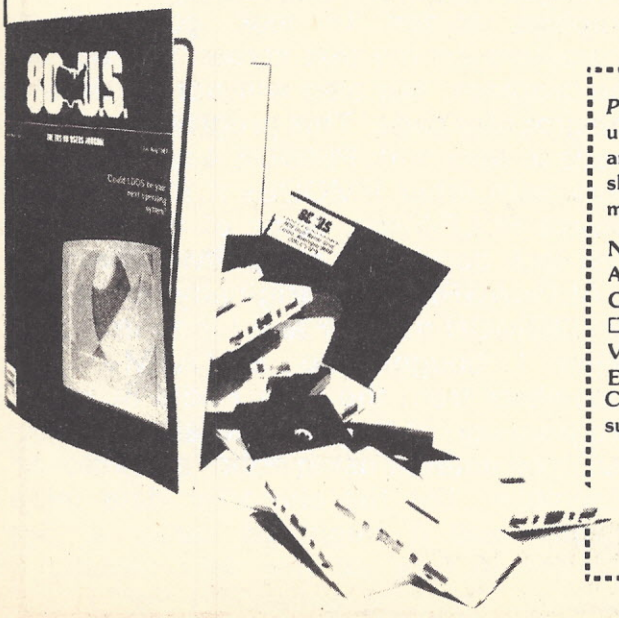


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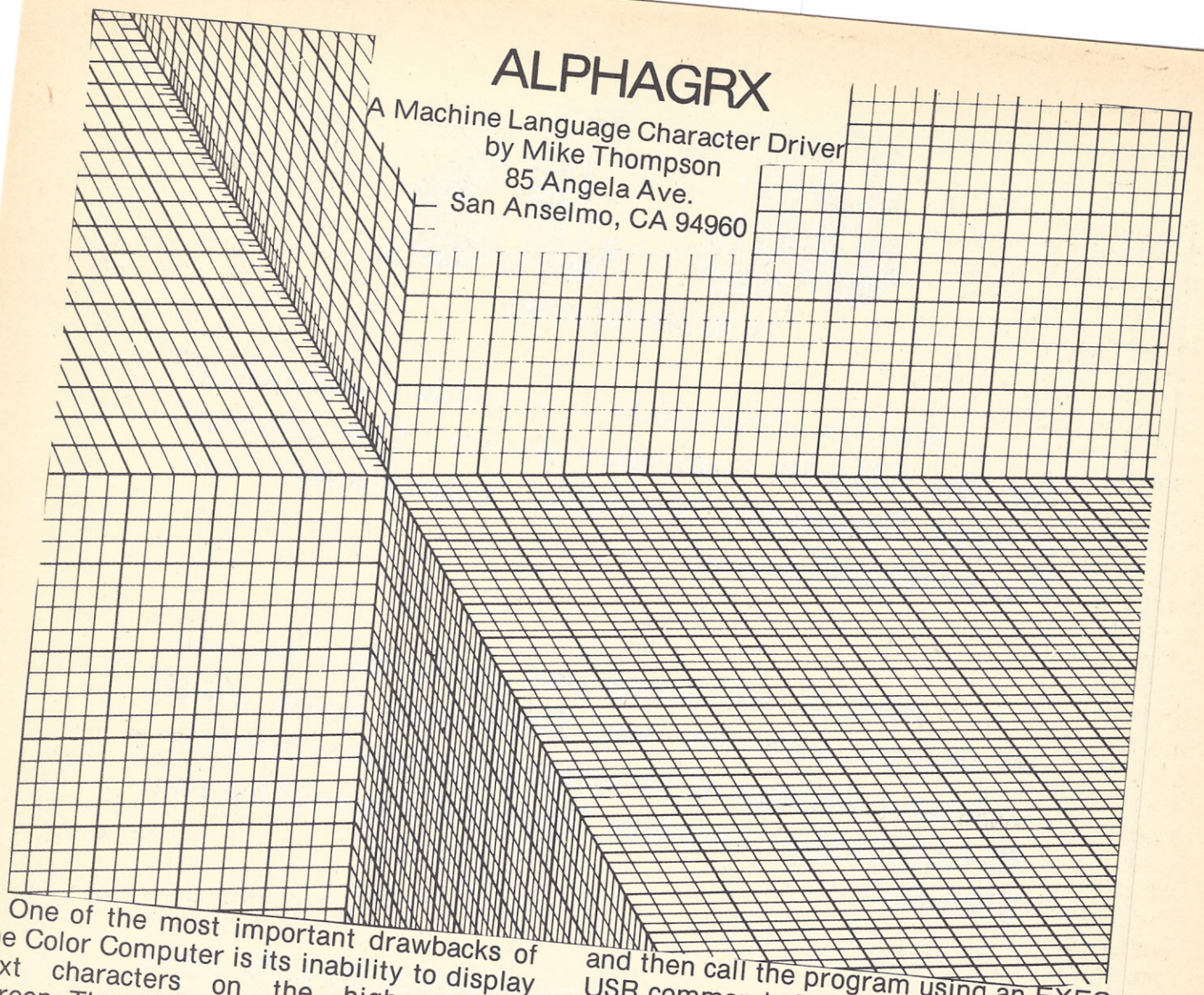
# ALPHAGRX

## A Machine Language Character Driver

by Mike Thompson
85 Angela Ave.
San Anselmo, CA 94960



One of the most important drawbacks of the Color Computer is its inability to display text characters on the high-resolution screen. The only solution that I have seen up to now are BASIC programs that either use DRAW statements to make characters or use data statements that tell the computer where to PSET each point in a character. These methods of displaying characters on the graphics screen are fine if you have plenty of time, but if you are working on a program in which time is important, even the fastest DRAW routine takes valuable time to just draw a few characters. A BASIC character driver can also be quite complicated to use because every different character must have its exact position calculated and they also take up a lot of memory and string space.

The machine language program ALPHAGRX alleviates most of the problems of BASIC character drivers by copying the text screen transferring it to the graphics, PMODE 4, screen. It also does this in less than a second. This means that all you have to do is arrange the text screen the way you want it using PRINT and POKE commands and then call the program using an EXEC or USR command. Once the text is transferred to the graphics screen you can then use the normal graphic commands to underline words or draw anything you wish around the text. The program will also handle reverse video characters, but they should be displayed against a dark background on the graphics screen to look good. Graphic characters on the text screen will not crash the program, but also will not be drawn on the graphics page. This program is primarily made to work with PMODE 4 although it will work with other PMODEs if four pages are always PCLEARed. Some of the characters may look garbled in other PMODEs too.

ALPHAGRX was originally made using the SIGMON monitor and I then improved it when I bought the EDTASM+ editor assembler from the local Radio Shack. The program part of the listing is short and could easily be entered using either a monitor or an assembler, but the character data table is lengthy and it might be easier to use a monitor to type all the data directly into memory. The program should start at $3D00

for 16K computers or at $7D00 for 32K computers and it should be EXECuted from the start of the program.

If you wish to change any of the characters you must change the data in the character table. See fig. 1 to see how the letter 'A' is coded and fig. 2 shows what might be an alternate configuration for that character. All the characters can be changed in a similar manner.

Before you CLOADM the program from tape you should CLEAR 200, &H3D00 for 16K or CLEAR 200, &H7D00 for 32K else the program may crash. Then in your BASIC program arrange the text like you want it to appear on the graphics screen using PRINT commands. Then EXEC the machine language program from its first address. The program will not erase the screen, but put the text over whatever was there before so use a PCLS before the program is EXECuted if you do not want this to occur. Now use the screen command to display the graphics screen and it should look exactly like the text screen. The only character that is different is the zero which I put a slash through so it is easier to distingush from 'O'. You can now use the normal graphic commands to draw around the text. Refer to the sample BASIC program to see a few examples on how to use the machine language program ALPHAGRX.

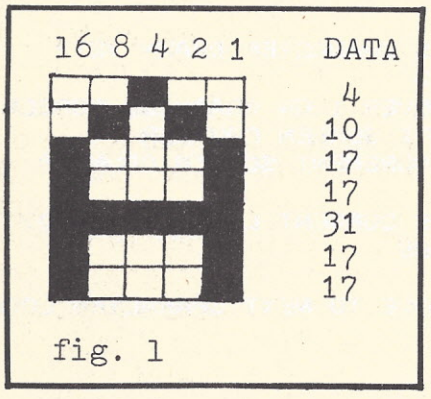


fig. 1

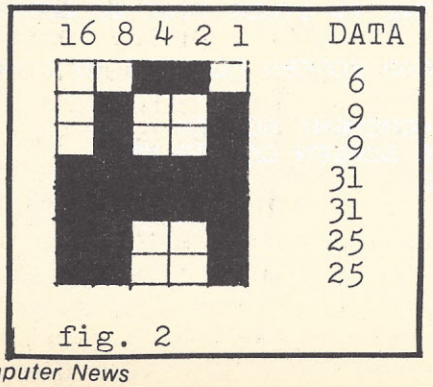


fig. 2

```
10 'THIS PROGRAM WILL TEST THE A
LPHAGRX SUBROUTINE
20 CLEAR 200,&H3D00 '&H7D00 - 32
K
30 CLS:PRINT"PLEASE PRESS PLAY O
N THE TAPE   RECORDER SO THAT I
CAN LOAD THE MACHINE LAGUAGE PRO
GRAM         'ALPHAGRX'"
40 PRINT:PRINT"YOU CAN USE 'ALPH
AGRX' WITH ANY OTHER PROGRAM AS
LONG AS YOU    REMEMBER TO RESER
VE MEMORY FOR  IT AS IN LINE #20
 OF THIS       PROGRAM."
50 CLOADM"ALPHAGRX"
60 PMODE4,1
70 'SET UP SCREEN FOR TEST
80 CLS:PRINT"alphagrx *** BY MIK
E THOMPSON"
90 PRINT:PRINT:PRINT:PRINT:PRINT
100 FORI=0TO127:POKEI+&H420,I:NE
XT
110 PRINT"'ALPHAGRX' IS GREAT FO
R GAMES   BECAUSE IT IS EXTREMEL
Y FAST ANDFOR GRAPHS BECAUSE IT
IS EASY TOUSE. THIS MACHINE LANG
UAGE SUB- ROUTINE CAN BE USED IN
 ANY      PROGRAM WHERE IT IS NE
CESSARY   THAT TEXT BE DISPLAYED
 WITH     GRAPHICS."
120 PRINT@480,"GRAPHICS SCREEN";
130 'PREPARE GRAPHICS SCREEN FOR
 TEXT
140 PCLS1:SCREEN1,0
150 LINE(0,0)-(64,11),PRESET,BF
160 LINE(0,12)-(255,35),PRESET,B
F
170 LINE(0,47)-(255,47),PRESET
180 LINE(0,59)-(255,59),PRESET
190 'EXECUTE SUBROUTINE AND LOOP
 BETWEEN TEXT AND GRAPHIC SCREEN
200 EXEC &H3D00 '&H7D00 - 32K
210 LINE(0,0)-(255,191),PRESET,B
220 PRINT@480,"TEXT SCREEN
    ";
230 FOR I=1TO1000:NEXT
240 SCREEN1,0:FOR I=1TO1000:NEXT
250 GOTO220
wow?_W{w;{o
```

```
00010 *         ALPHAGRX
00020 *(C) 1982 BY MIKE THOMPSON
00030 *CLEAR 200,&H3D00 (&H7D00 32K)
00040 *CLOADM "ALPHAGRX"
00050 *EXEC &H3D00 (&H7D00 - 32K)
00060 *         ORG     $7D00   32K
00070           ORG     $3D00   16K
```

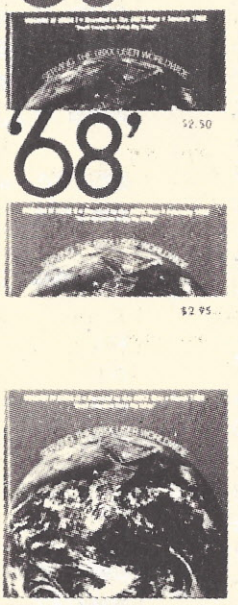
```
3D00 8E   0400      00080 START   LDX     #$400    START OF SCREEN
3D03 109E BA        00090         LDY     $BA      STRT OF GRAPHICS PAGE
3D06 1F   20        00100         TFR     Y,D
3D08 C3   0060      00110         ADDD    #$60     MOVE DOWN SCREEN A LITTLE
3D0B 1F   02        00120         TFR     D,Y
3D0D 86   01        00130         LDA     #1       SET SCREEN COUNTER TO 1
3D0F B7   3D7F      00140         STA     DATA1
3D12 A6   84        00150 LOOP2   LDA     ,X       LOAD CHARACTER
3D14 81   40        00160         CMPA    #$40     IS IT LESS THAN $40?
3D16 25   02        00170         BLO     A1       YES
3D18 80   40        00180         SUBA    #$40     SUBTRACT $40
3D1A C6   07        00190 A1      LDB     #7       LOAD MULTIPLIER
3D1C 3D             00200         MUL
3D1D C3   3D81      00210         ADDD    #TABLE   ADD BEGINING OF TABLE
3D20 1F   03        00220         TFR     D,U
3D22 C6   01        00230         LDB     #1       SET BYTE COUNTER TO 1
3D24 F7   3D80      00240         STB     DATA2
3D27 A6   40        00250 LOOP1   LDA     0,U      LOAD CHARACTER DATA
3D29 48             00260         ASLA             SHIFT LEFT ONE BIT
3D2A E6   00        00270         LDB     0,X      LOAD CHRACTER AGAIN
3D2C C1   40        00280         CMPB    #$40     IS IT REVERSE VIDEO
3D2E 25   01        00290         BLO     A2       YES
3D30 43             00300         COMA             REVERS COLOR OF CHARACTER
3D31 C1   60        00310 A2      CMPB    #$60     IS IT A SPACE?
3D33 27   04        00320         BEQ     A3       YES
3D35 C1   80        00330         CMPB    #$80     IS IT A GRAPHICS CHARACTER?
3D37 25   09        00340         BLO     A4       NO
3D39 1F   20        00350 A3      TFR     Y,D      SKIP DRAWING CHARACTER
3D3B C3   00E0      00360         ADDD    #$E0     MOVE TO NEXT POSITION
3D3E 1F   02        00370         TFR     D,Y
3D40 20   13        00380         BRA     A5       GOTO END OF LOOP
3D42 A7   A4        00390 A4      STA     ,Y       STORE DATA INTO GRAPHICS SCREEN
3D44 86   20        00400         LDA     #$20     MOVE DOWN ON GRAPHICS SCREEN
3D46 31   A6        00410         LEAY    A,Y
3D48 33   41        00420         LEAU    1,U      GET NEXT CHARACTER DATA FROM TA
BLE
3D4A F6   3D80      00430         LDB     DATA2
3D4D 5C             00440         INCB
3D4E F7   3D80      00450         STB     DATA2
3D51 C1   08        00460         CMPB    #8       IS CHARACTER DRAWN YET?
3D53 25   D2        00470         BLO     LOOP1    NO
3D55 31   21        00480 A5      LEAY    1,Y      MOVER 1 ON GRAPHICS SCREEN
3D57 B6   3D7F      00490         LDA     DATA1    GET SCREEN COUNTER
3D5A 4C             00500         INCA             INCREMENT SCREEN COUNTER
3D5B B7   3D7F      00510         STA     DATA1
3D5E 81   20        00520         CMPA    #$20     IS CURRENT LINE FINISHED?
3D60 22   09        00530         BHI     A6       YES
3D62 1F   20        00540         TFR     Y,D
3D64 83   00E0      00550         SUBD    #$E0     MOVE TO NEXT CHARACTER LOCATION
3D67 1F   02        00560         TFR     D,Y
3D69 20   0C        00570         BRA     A7
3D6B 1F   20        00580 A6      TFR     Y,D
3D6D C3   0080      00590         ADDD    #$80     MOVE TO OTHER SIDE OF SCREEN
3D70 1F   02        00600         TFR     D,Y
3D72 86   01        00610         LDA     #1       LOAD SCREEN COUNTER TO 1 AGAIN
3D74 B7   3D7F      00620         STA     DATA1
3D77 30   01        00630 A7      LEAX    1,X      INCREMENT SCREEN
3D79 8C   0600      00640         CMPX    #$600    IS SCREEN COPIED YET?
3D7C 25   94        00650         BLO     LOOP2    NO
3D7E 39             00660 DONE    RTS
3D7F                00670 DATA1   RMB     $01
3D80                00680 DATA2   RMB     $01
```

# ™TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter:

> There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical informations on the TRS-80 color computer™. Devoted to SS-50 6800 and 6809 machines up to now, 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

NOTE: This and other interesting and needed articles for the Radio Shack TRS-80 color computer™ are being included monthly in 68 Micro Journal—The Largest specialty computer magazine in the world!



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Currently, and even before the Color Computer™ hit the stores, **68 Micro Journal™** was devoting more space to the TRS-80C Color Computer™ and information concerning the Motorola 6809 (which is the CPU in the Color Computer™) than ANY OTHER Computer Magazine. Examples include:

**REVIEWS** of the three major Disk Control Systems for the Color Computer™, most of the Monitors, Assemblers, and Disassemblers, Word Processors and Editors, "Terminal" Programs (for use with Modems, Communications with other Computers, etc.), and of course, Games.

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Bob Nay
Color Computer Editor

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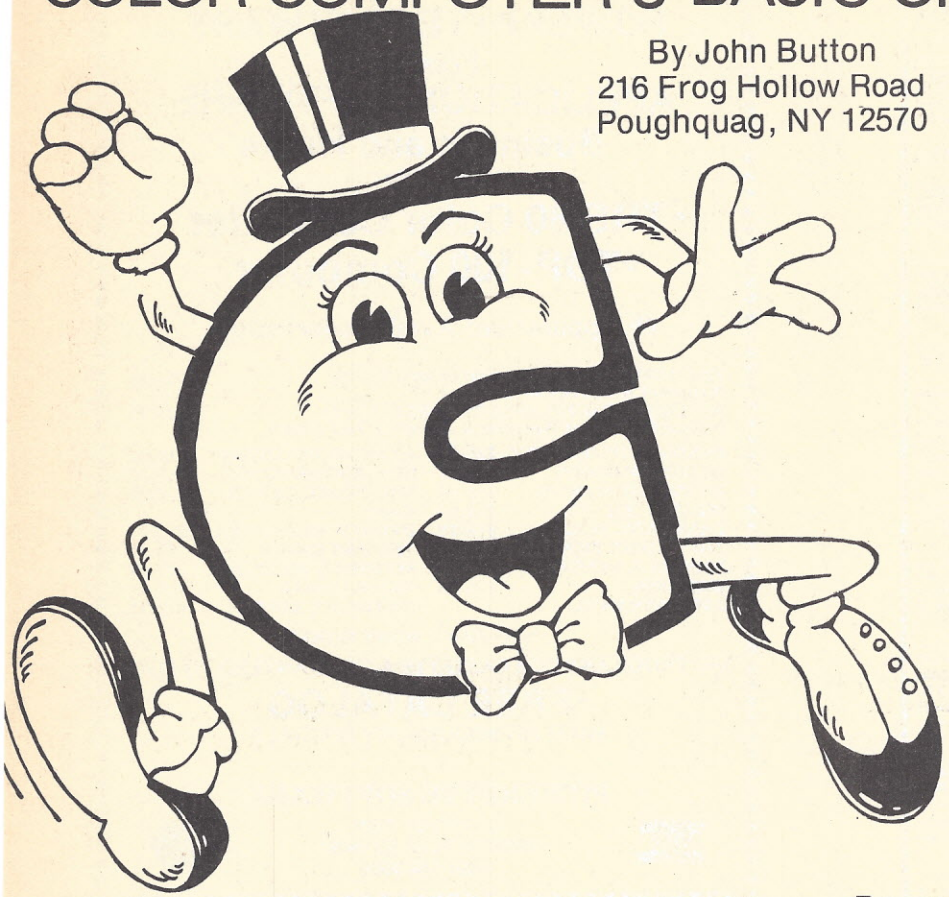
```
TABLE FCB 14,17,1,13,21,21,14   @
      FCB 4,10,17,17,31,17,17   A
      FCB 30,9,9,14,9,9,30      B
      FCB 14,17,16,16,16,17,14  C
      FCB 30,9,9,9,9,9,30       D
      FCB 31,16,16,30,16,16,31  E
      FCB 31,16,16,30,16,16,16  F
      FCB 15,16,16,19,17,17,14  G
      FCB 17,17,17,31,17,17,17  H
      FCB 14,4,4,4,4,4,14       I
      FCB 1,1,1,1,1,17,14       J
      FCB 17,18,20,24,20,18,17  K
      FCB 16,16,16,16,16,16,31  L
      FCB 17,27,21,21,17,17,17  M
      FCB 17,25,21,19,17,17,17  N
      FCB 14,17,17,17,17,17,14  O
      FCB 30,17,17,30,16,16,16  P
      FCB 14,17,17,17,21,18,13  Q
      FCB 30,17,17,30,20,18,17  R
      FCB 14,17,8,4,2,17,14     S
      FCB 31,4,4,4,4,4,4        T
      FCB 17,17,17,17,17,17,14  U
      FCB 17,17,17,10,10,4,4    V
      FCB 17,17,17,21,21,27,17  W
      FCB 17,17,10,4,10,17,17   X
      FCB 17,17,10,4,4,4,4      Y
      FCB 31,1,2,4,8,16,31      Z
      FCB 14,8,8,8,8,8,14       [
      FCB 16,16,8,4,2,1,1       \
      FCB 14,2,2,2,2,2,14 ]     ]
      FCB 4,14,21,4,4,4,4 ^     ^
      FCB 0,4,8,31,8,4,0 LEFT ARROW
      FCB 0,0,0,0,0,0,0 SPACE
      FCB 8,8,8,8,8,0,8         !
      FCB 10,10,10,0,0,0,0      "
      FCB 10,10,27,0,27,10,10   #
      FCB 4,15,17,14,1,30,4     $
      FCB 25,25,2,4,8,19,19     %
      FCB 8,20,20,28,21,18,13   &
      FCB 12,12,12,0,0,0,0      '
      FCB 4,8,16,16,16,8,4      (
      FCB 4,2,1,1,1,2,4         )
      FCB 0,4,14,31,14,4,0      *
      FCB 0,4,4,31,4,4,0        +
      FCB 0,0,0,24,24,8,16      ,
      FCB 0,0,0,31,0,0,0        -
      FCB 0,0,0,0,0,24,24       .
      FCB 1,1,2,4,8,16,16       /
      FCB 14,17,19,21,25,17,14  0
      FCB 4,12,4,4,4,4,14       1
      FCB 14,17,1,14,16,16,31   2
      FCB 14,17,1,6,1,17,14     3
      FCB 2,6,10,31,2,2,2       4
      FCB 31,16,30,1,1,17,14    5
      FCB 14,16,16,30,17,17,14  6
      FCB 31,1,2,4,8,16,16      7
      FCB 14,17,17,14,17,17,14  8
      FCB 14,17,17,15,1,1,14    9
      FCB 0,12,12,0,12,12,0     :
      FCB 12,12,0,12,12,4,8     ;
      FCB 2,4,8,16,8,4,2        <
      FCB 0,0,31,0,31,0,0       =
      FCB 8,4,2,1,2,4,8         >
      FCB 12,18,2,4,4,0,4       ?

05170 *         END     $7D00   32K
05180           END     $3D00   16K

00000 TOTAL ERRORS

A1      3D1A
A2      3D31
A3      3D39
A4      3D42
A5      3D55
A6      3D6B
A7      3D77
DATA1   3D7F
DATA2   3D80
DONE    3D7E
LOOP1   3D27
LOOP2   3D12
START   3D00
TABLE   3D81
```

# ADDITION OF A NEW COMMAND TO THE TRS-80 COLOR COMPUTER'S BASIC OPERATING SYSTEM

By John Button
216 Frog Hollow Road
Poughquag, NY 12570



How many times do you find yourself loading a basic program from tape and executing it immediately after loading while wishing you could do it all with just one command? How many times have you found a need for the ability to ''link'' or ''chain'' two or more of your basic programs together because they would not all fit into memory at one time? Well, if you've ever had these problems you know that the Color Computer does not allow for either situation. As a result there is a need for a command which BASIC will recognize that loads from tape a BASIC program and executes it as soon as loading is completed. The new command -RUNC- will provide such a function.

RUNC is a machine language extention to the existing Microsoft interpreter provided in the Color Computer. By loading and executing a machine language program after turning your computer on, modifications are performed to add an additional command to the interpreter. It will then execute from BASIC command level or defered mode (in programs) as if it was any other command. The code for this command is hidden from your machine so you cannot accidentally erase it.

By providing this command to the programmer both the problems described above can be solved. Typing ''RUNC'' at command level will load the next BASIC program on tape (crunched or ASCII format) and when loading is complete will begin executing just as if you had typed ''RUN''. RUNC as a line in a program will erase the existing code in memory, load the next program and execute it after loading. The ''RUN'' and ''CLOAD'' commands continue to be available as they were before modification.

In addition to the above simple examples, RUNC can be treated somewhat like a mixture between ''RUN'' and ''CLOAD'' in that program names and line numbers can be used to perform as they would in the standard commands.

Syntax and example uses of RUNC can be found in figure 1, additionally, the machine code to produce it is included with comments. You may use the code provided directly by way of an assembler or enter and execute one of the BASIC programs provided in figure 2. Two listings are provided, one for computers with Extended Basic and one for Non-Extended. In either case after entering

the BASIC code you should save it before executing as RUNC will clear program memory. When using Non-Extended code, space must be saved in memory to allow for machine code. This is done by using POKE 25,7:POKE 26,17:POKE 1808,0:NEW commands entered at command level before loading the program.

Using Extended BASIC, if the EXEC command in line 110 is replaced with END you will be returned to command mode after machine code is loaded into memory. This will allow an opportunity to save the machine code directly on tape (CSAVEM"RUNC", &H610, &H70B, &H610). before issuing EXEC &H610.

Using the RUNC command you will be able to perform a number of complex linking functions. It could be used to allow one program to provide game instructions and then link to the game program after printing all instructions. Thus all memory will be available for the game program and not used up by unnecessary instructions. Another possibility might be to have a master menu program which will RUNC a program name the user selects.

I hope you find this new command useful and emply it in some new creative ways.

---

Figure 1

```
**************************        RUNC

CODE TO MOVE RAM TOP ADDRESS DOWN & LOAD "RUNC" ABOVE TOP OF RAM.
RUNC COMMAND WILL LOAD CASSETTE CRUNCHED OR ASCII BASIC PROGRAM
AND EXECUTE IT AT THE DESIRED LINE NUMBER AFTER LOADING IS COMPLETE.

SYNTAX --- RUN  C "program name" line #

WHERE program name AND line # ARE OPTIONS AND ARE USED AS IN THE
CLOAD AND RUN COMMANDS.   NOTE THAT SPACES ARE ALLOWED BETWEEN RUN AND C
ALSO, BETWEEN C AND THE PROGRAM NAME, AND FINALLY, BETWEEN PROGRAM NAME
AND LINE NUMBER.

EXAMPLES ---

     RUNC          - LOADS AND RUNS NEXT PROGRAM ON TAPE
     RUNC"TEST"    - LOADS AND RUNS PROGRAM NAMED "TEST" OFF TAPE
     RUNC"TEST"20 - LOADS AND RUNS PROGRAM NAMED "TEST" OFF TAPE AND
                    STARTS EXECUTION AT LINE NUMBER 20
     RUNC""30      -  LOADS AND RUNS NEXT PROGRAM ON TAPE AT LINE NUMBER 30

0610   DC 74      LDD  74          GET TOP OF RAM
0612   83 00C2    SUBD #00C2       MOVE IT DOWN TO MAKE ROOM FOR CODE
0615   DD 74      STD  74          SAVE IT
0617   DD 27      STD  27          ALSO AS TOP OF CLEARED SPACE
0619   DD 23      STD  23          AND START OF STRING SPACE
061B   83 00C8    SUBD #00C8       ALLOW 200 BYTES STRING SPACE
061E   DD 21      STD  21          SET BOTTOM OF STRING SPACE
0620   1F 04      TFR  D,S         MOVE STACK
0622   BD AD19    JSR  AD19        DO A "NEW"
0625   DE 74      LDU  74          GET NEW TOP OF RAM ADDRESS
0627   33 42      LEAU 02,U        GO UP TWO BYTES - TARGET ADDRESS
0629   30 8C1D    LEAX 0649,PCR    POINT TO START OF "RUNC" CODE TO BE MOVED
062C   C6 C2      LDB  #C2         NUMBER OF BYTES TO BE MOVED
062E   BD A59A    JSR  A59A        GO MOVE CODE TO ABOVE TOP OF RAM
0631   9E 74      LDX  74          GET BACK TOP OF RAM
0633   30 02      LEAX 02,X        GET ADDRESS OF EXT. BASIC ENTRY POINT
0635   F6 0194    LDB  0194        GET CURRENT "RUN" HOOK OP CODE
0638   C1 7E      CMPB #7E         IS IT A "JMP"?
```

```
063A   27 07      BEQ  0643      YES, MUST BE EXT. BASIC
063C   30 02      LEAX 02,X      NO THEN POINT AT NON-EXT. BASIC
                  *              ENTRY ADDRESS
063E   86 7E      LDA  #7E       GET "JMP" OP CODE
0640   B7 0194    STA  0194      SAVE OP CODE IN "RUN" HOOK ADDRESS
0643   BF 0195    STX  0195      SAVE "RUNC" ENTRY ADDRESS
0646   7E A027    JMP  A027      GO DO A WARM START RESET
0649   BD 829C    JSR  829C      GO DO EXT. BASIC RUN SET-UP
064C   9D A5      JSR  A5        GET CURRENT CHARACTER FROM BASIC
064E   81 43      CMPA #43       IS IT A "C"?
0650   27 01      BEQ  0653      YES, DO "RUNC"
0652   39         RTS            NO, MUST BE SOMETHING ELSE
0653   30 8D009E  LEAX 06F5,PCR  GET ADDRESS OF "RUNC" ERROR DRIVER
0657   BF 018F    STX  018F      SAVE IT INTO RAM HOOK
065A   86 7E      LDA  #7E       GET "JMP" OP CODE
065C   B7 018E    STA  018E      SAVE IN HOOK
065F   9D 9F      JSR  9F        GET NEXT CHARACTER FROM BASIC
0661   0F 78      CLR  78        CLOSE FILES
0663   BD A578    JSR  A578      SCAN OFF FILE NAME
0666   9E 68      LDX  68        GET CURRENT LINE NUMBER
0668   AF 8D009C  STX  0708,PCR  SAVE IT FOR THE "RUNC" ERROR DRIVER
066C   8E FFFF    LDX  #FFFF     GET CODE FOR ILLEGAL LINE NUMBER
066F   9F 68      STX  68        INDICATES EXECUTION STARTS AT 1ST LINE
0671   CE AEBF    LDU  #AEBF     GET RETURN ENTRY POINT FOR NO LINE
                  *              NUMBER RUN
0674   9D A5      JSR  A5        GET CURRENT CHARACTER FROM BASIC
0676   27 0C      BEQ  0684      NO CHARACTER, MUST BE AT END OF LINE
0678   BD AF67    JSR  AF67      GO SCAN OFF DESIRED LINE # & SAVE
067B   9E 2B      LDX  2B        GET DESIRED LINE #
067D   AF 8D0089  STX  070A,PCR  SAVE IT FOR LATER
0681   CE AEAD    LDU  #AEAD     GET RUN AT LINE NUMBER ENTRY POINT
0684   EF 8C7F    STU  0706,PCR  SAVE IT AS RETURN ADDRESS
0687   BD A648    JSR  A648      GO SEARCH FOR THE FILE
068A   7D 01E4    TST  01E4      CHECK FILE DESCRIPTOR
068D   27 26      BEQ  06B5      BRANCH IF CRUNCHED BASIC OR MACHINE

**************************     ASCII LOAD ROUTINE

068F   B6 01E3    LDA  01E3      GET MSB OF FILE DESCRIPTOR
0692   27 26      BEQ  06BA      "BAD FILE MODE" ERROR - FILE IS DATA
0694   BD AD19    JSR  AD19      DO A "NEW"
0697   30 8C14    LEAX 06AE,PCR  GET ENTRY POINT AFTER CODE IS LOADED
069A   BF 0186    STX  0186      SAVE IT IN RAM HOOK
069D   86 7E      LDA  #7E       GET "JMP" OP CODE
069F   B7 0185    STA  0185      SAVE IN RAM HOOK
06A2   86 FF      LDA  #FF       SET TAPE TYPE
06A4   97 6F      STA  6F        SET OUTPUT SWITCH TO TAPE
06A6   0C 78      INC  78        FILE TYPE = INPUT
06A8   BD A635    JSR  A635      GO LOAD ASCII RECORD
06AB   7E AC7C    JMP  AC7C      GO LOAD & CRUNCH INPUT
06AE   32 62      LEAS 02,S      REMOVE RETURN ADDR
06B0   BD A42D    JSR  A42D      GO CLOSE FILES
06B3   20 2E      BRA  06E3      CONTINUE AS IN CRUNCHED BASIC LOAD

**************************     CRUNCHED BASIC LOAD ROUTINE

06B5   B6 01E2    LDA  01E2      GET FILE TYPE
06B8   27 03      BEQ  06BD      IF CRUNCHED BASIC CONTINUE
```

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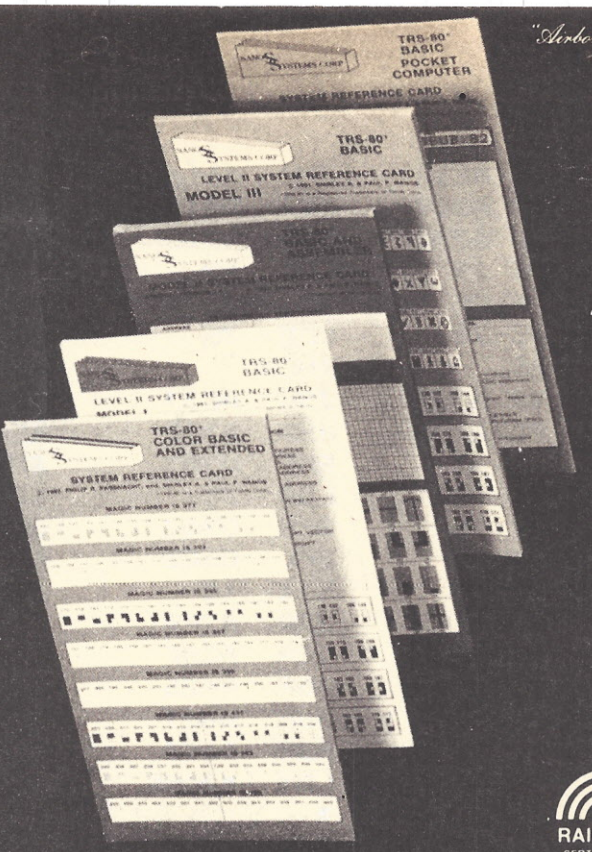


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```
06BA   7E A616    JMP  A616       MUST BE MACHINE - "BAD FILE MODE" ERROR
06BD   BD AD19    JSR  AD19       DO A "NEW"
06C0   BD A77C    JSR  A77C       TURN ON TAPE AND START READING
06C3   9E 19      LDX  19         GET START PROGRAM ADDR
06C5   9F 7E      STX  7E         STORE IT TO CODE LOAD POINTER
06C7   DC 7E      LDD  7E         GET CURRENT LOAD ADDR
06C9   4C         INCA              ADD 256 - ONE BLOCK SIZE
06CA   BD AC37    JSR  AC37       SEE IF ROOM BELOW STACK
06CD   BD A70B    JSR  A70B       READ A BLOCK
06D0   26 31      BNE  0703       GOT AN ERROR DURING READ
06D2   96 7C      LDA  7C         GET BLOCK #
06D4   27 2D      BEQ  0703       GOT AN ERROR
06D6   2A ED      BPL  06C5       READ MORE - NOT LAST BLOCK
06D8   9F 1B      STX  1B         SAVE END PROGRAM ADDR POINTER
06DA   BD A7E9    JSR  A7E9       TURN OFF TAPE DECK
06DD   BD ACEF    JSR  ACEF       SET UP LINE POINTERS IN BASIC CODE
06E0   BD A426    JSR  A426       CLOSE FILES
06E3   BD AD21    JSR  AD21       CLEAR VARIABLES AND MOVE STACK
06E6   8D 12      BSR  06FA       RESET RAM HOOKS
06E8   8E AD9E    LDX  #AD9E      GET ADDR OF START COMMAND INTERPRETATION
                  *               LOOP
06EB   34 10      PSHS X          SAVE IT ON STACK AS RTS ADDR
06ED   AE 8C1A    LDX  070A,PCR   GET BACK DESIRED RUN AT LINE #
06F0   9F 2B      STX  2B         SAVE IT
06F2   6E 9C11    JMP  [0706,PCR] JUMP TO RUN (OR RUN AT) CODE IN ROM
06F5   AE 8C10    LDX  0708,PCR   GET LINE NUMBER OF RUNC COMMAND
06F8   9F 68      STX  68         SAVE IT AS THE CURRENT LINE # FOR ERROR
06FA   86 39      LDA  #39        GET "RTS" OP CODE
06FC   B7 0185    STA  0185       SAVE IN ASCII LOAD RAM HOOK
06FF   B7 018E    STA  018E       SAVE IN ERROR DRIVER RAM HOOK
0702   39         RTS
0703   7E A4F8    JMP  A4F8       GO DO I/O ERROR
0706   00 00                      RETURN ENTRY POINT IN ROM
0708   00 00                      LINE # OF RUNC COMMAND TEMP SAVE LOCATION
                  *               FOR ERROR DRIVER
070A   00 00                      LINE # TO BEGIN EXECUTION TEMP SAVE
```

Figure 2

Basic Program to Add the RUNC Command

EXTENDED BASIC

```
10 PCLEAR 1
20 CLS
30 FOR A=&H610 TO &H70B
40 READ V$
50 PRINT@0,"CURRENT DATA STATEME
NT";PEEK(&H31)*256+PEEK(&H32)
60 V=VAL("&H"+V$)
70 POKE A,V
80 T=T+V
90 NEXT A
100 IF T<>29358 THEN PRINT "DATA
 ERROR":STOP
110 EXEC &H610
```

NON-EXTENDED BASIC

```
10 CLS
20 FOR A= 1552 TO 1803
30 READ V$:C$=LEFT$(V$,1):GOSUB101
40 PRINT@0,"CURRENT DATA STATEME
NT";PEEK(49)*256+PEEK(50)
50 V=16*P:C$=RIGHT$(V$,1):GOSUB 101
60 V=V+P:T=T+V
70 POKE A,V
80 NEXT A
90 IF T<>29358 THEN PRINT "DATA
ERROR":STOP
100 EXEC 1552
101 FOR P=0 TO 15
102 IF MID$("0123456789ABCDEF",P
+1,1)=C$ THEN RETURN
103 NEXT P
104 PRINT "ENTRY ERROR IN DATA ";V$
105 STOP
```

(INCLUDE DATA STATEMENTS
WITH EITHER PROGRAM VERSION)

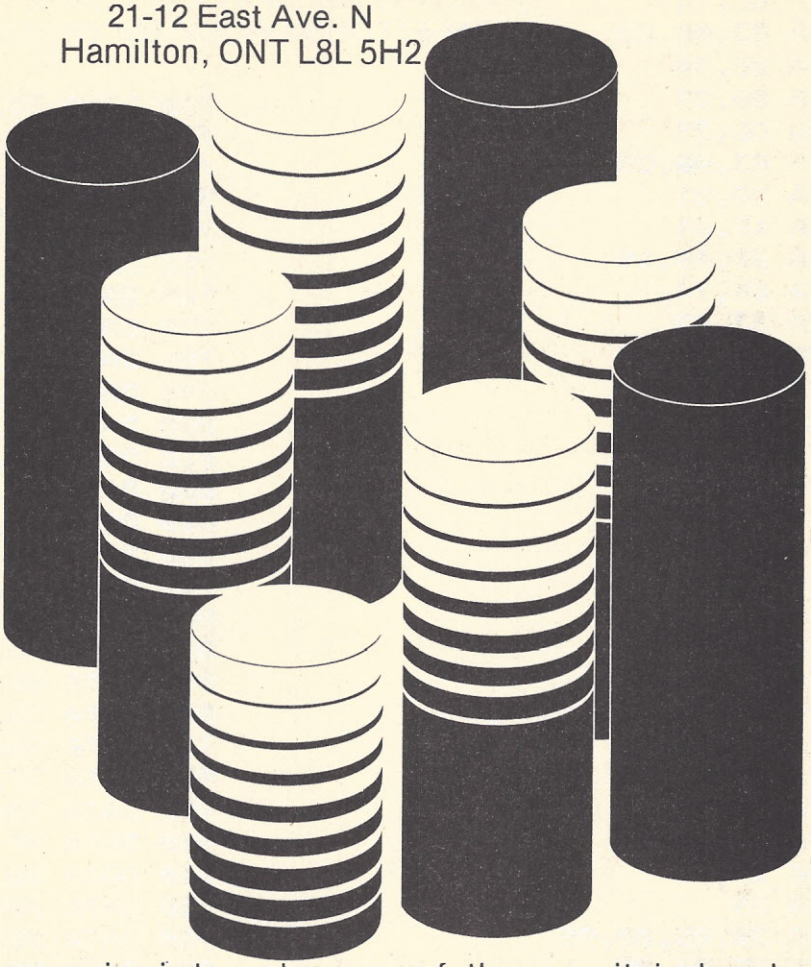
```
120 DATA DC,74
130 DATA 83,00,C2
140 DATA DD,74
150 DATA DD,27
160 DATA DD,23
170 DATA 83,00,C8
180 DATA DD,21
190 DATA 1F,04
200 DATA BD,AD,19
210 DATA DE,74
220 DATA 33,42
230 DATA 30,8C,1D
240 DATA C6,C2
250 DATA BD,A5,9A
260 DATA 9E,74
270 DATA 30,02
280 DATA F6,01,94
290 DATA C1,7E
300 DATA 27,07
310 DATA 30,02
320 DATA 86,7E
330 DATA B7,01,94
340 DATA BF,01,95
350 DATA 7E,A0,27
360 DATA BD,82,9C
370 DATA 9D,A5
380 DATA 81,43
390 DATA 27,01
400 DATA 39
410 DATA 30,8D,00,9E
420 DATA BF,01,8F
430 DATA 86,7E
440 DATA B7,01,8E
450 DATA 9D,9F
460 DATA 0F,78
470 DATA BD,A5,78
480 DATA 9E,68
490 DATA AF,8D,00,9C
500 DATA 8E,FF,FF
510 DATA 9F,68
520 DATA CE,AE,BF
530 DATA 9D,A5
540 DATA 27,0C
550 DATA BD,AF,67
560 DATA 9E,2B
570 DATA AF,8D,00,89
580 DATA CE,AE,AD
590 DATA EF,8C,7F
600 DATA BD,A6,48
610 DATA 7D,01,E4
620 DATA 27,26
630 DATA B6,01,E3
640 DATA 27,26
650 DATA BD,AD,19
660 DATA 30,8C,14
670 DATA BF,01,86
680 DATA 86,7E
690 DATA B7,01,85
700 DATA 86,FF
710 DATA 97,6F
720 DATA 0C,78
730 DATA BD,A6,35
740 DATA 7E,AC,7C
750 DATA 32,62
760 DATA BD,A4,2D
770 DATA 20,2E
780 DATA B6,01,E2
790 DATA 27,03
800 DATA 7E,A6,16
810 DATA BD,AD,19
820 DATA BD,A7,7C
830 DATA 9E,19
840 DATA 9F,7E
850 DATA DC,7E
860 DATA 4C
870 DATA BD,AC,37
880 DATA BD,A7,0B
890 DATA 26,31
900 DATA 96,7C
910 DATA 27,2D
920 DATA 2A,ED
930 DATA 9F,1B
940 DATA BD,A7,E9
950 DATA BD,AC,EF
960 DATA BD,A4,26
970 DATA BD,AD,21
980 DATA 8D,12
990 DATA 8E,AD,9E
1000 DATA 34,10
1010 DATA AE,8C,1A
1020 DATA 9F,2B
1030 DATA 6E,9C,11
1040 DATA AE,8C,10
1050 DATA 9F,68
1060 DATA 86,39
1070 DATA B7,01,85
1080 DATA B7,01,8E
1090 DATA 39
1100 DATA 7E,A4,F8
1110 DATA 00,00
1120 DATA 00,00
1130 DATA 00,00
```

*COLOR COMPUTER NEWS TIP*

You can use Radio Shack's "Color File" ROM pac to print mailing labels. Use one-up labels 15/16 inch high. Define 5 fields but use only four. Make sure to designate the last line as alphabetic or a zero will enter automatically. Of course the fifth line could be used as a sorting code.

# BACCARAT

by Geoff Wells
21-12 East Ave. N
Hamilton, ONT L8L 5H2



The primary purpose of this magazine is to provide a forum for the exchange of ideas and information among its readers. All of us, whether beginner or expert, can benefit from this sharing of knowledge. If you just copy the program listings without attempting to understand how they work you deny yourself the opportunity to participate in this learning experience. Often, however, the listings are presented in a forum understandable to a computer but almost incomprehensible to humans.

When considerations of memory and execution speed allow the programs should be easy to read and understand. By using single statement lines, remarks and indented loops the flow of the program becomes much easier to visualize. Our version of BASIC will automatically remove any extra spaces between the line number and the first statement unless those extra spaces are either preceeded with a colon or inserted using the edit command.

BACCARAT is moderately difficult but even those new to computing should have little difficulty tracing the program flow because of the way it is layed out. Take special note of lines 1320 and 1350 as they demonstrate a structure I have not seen reported before. Notice the difference between 'IF A AND (B OR C)'—-' IF A AND B OR C' In the first case 'A' must be true plus either 'B' or 'C' must be true. In the second case both 'A' and 'B' must be true or 'C' alone must be true.

BACCARAT is one of the simplest of gambling games as all decisions are determined by the cards played and not by the participants. Your only option is to bet on the bank hand or the player hand. Since the bank hand has the advantage the casino takes a 5% commission on all winning bank hand bets. This gives the house an overall edge of just over 1%.

```
1Ø '                    ******************
**********
2Ø '                    *  BACCARAT---VEGA
S RULES  *
3Ø '                    *COPYRIGHT 1982 GE
OFF WELLS*
4Ø '                    *     21-12 EAST A
VE.N.    *
```

```
50 '            *      HAMILTON, ON
TARIO     *
60 '            *      CANADA.    L8
L 5H2     *
70 '            ********************
**********
80 '
90 '
100 CLEAR 1000
110 DIM C(13,32),P(8,12),P$(2,12
),H(6),PC$(2)
120 CB$=STRING$(10,RND(7)*16+137
):'***** CARD BACK DESIGN
130 BB$=STRING$(10," ")
140 U$="$$#####":UC$="$$###.##":U
S$="$$#######,.##"
150 '
160 '
170 CLS
180 PRINT@224,"";
190 INPUT"  HOW MANY PLAYERS (1-
12) ";N
200 IF N<1 OR N>12 THEN 190
210 '
220 '
230 FOR Y=1 TO N
240 :  CLS
250 :  PRINT@64,"WHAT IS YOUR NA
ME PLAYER #"Y
260 :  INPUT P$(1,Y)
270 :  IF LEN(P$(1,Y))<=8 THEN 3
00
280 :      PRINT:PRINT"SHORTEN YO
UR NAME TO 8 CHAR'S"
290 :      GOTO 260
300 :  PRINT:PRINT"HOW MUCH IS Y
OUR STAKE "P$(1,Y)
310 :  INPUT P(1,Y)
320 :  IF P(1,Y)=>100 THEN 360
330 :      PRINT:PRINT"*YOU NEED
AT LEAST $100 TO PLAY*"
340 :      PRINTTAB(9)"AT THIS TA
BLE."
350 :      GOTO 310
360 :  P(8,Y)=P(1,Y):'***** SET
CURRENT STAKE TO START STAKE
370 NEXT Y
380 '
390 '
400 '*************************
410 '*  START OF GAME LOOP   *
420 '*************************
430 FOR Q=1 TO 70:'***** 8 DECKS
/POSSIBLE 6 CARDS PER HAND
440 :  FOR Y=1 TO 6
450 :      H(Y)=0:'***** HAND ARR
AY
460 :  NEXT Y
470 :  BK=0:'***** BROKE PLAYER
COUNTER
480 :  FOR Y=1 TO N
490 :      CLS
500 :      PRINT@70,"**PLACE YOUR
 BETS**"
510 :      P(2,Y)=0:P$(2,Y)=""
520 :      IF P(8,Y)=>20 THEN 640
530 :         PRINT:PRINTTAB(3) P
$(1,Y)" HAS LESS THAN THE"
540 :         PRINTTAB(7) "MINIMU
M BET OF $20"
550 :         BK=BK+1
560 :         FOR T=1 TO 500
570 :         NEXT T
580 :         IF BK<>N THEN 820
590 :            PRINT:PRINT" *AL
L PLAYERS ARE OUT OF FUNDS*"
600 :            PRINTTAB(6)"SO T
HE GAME IS OVER"
610 :            FOR T=1 TO 3000
620 :            NEXT T
630 :            GOTO 1780
640 :      PRINT:PRINT"WHAT IS YO
UR BET "P$(1,Y)
650 :      INPUT P(2,Y)
660 :      IF P(2,Y)<=P(8,Y) THEN
 690
670 :         PRINT"    *YOU ONLY
HAVE";:PRINTUSING UC$;P(8,Y);:PR
INT" LEFT*"
680 :         GOTO 640
690 :      IF P(2,Y)=>20 THEN 720
700 :         PRINTTAB(6)"*MINIMU
M BET IS $20*"
710 :         GOTO 640
720 :      IF P(2,Y)<=2000 THEN 7
50
730 :         PRINTTAB(5)"*MAXIMU
M BET IS $2000*"
740 :         GOTO 640
750 :      J=INT(P(2,Y)/5):CH=P(2
,Y)-5*J
760 :      IF CH=0 THEN 790
770 :         PRINT"    *THE SMALL
EST CHIP IS $5*"
780 :         GOTO 640
790 :      INPUT"FOR BANK OR PLAY
ER (B OR P)";P$(2,Y)
800 :      IF P$(2,Y)="B" OR P$(2
,Y)="P" THEN 820
810 :         GOTO 790
820 :  NEXT Y
830 '
840 '
850 '*************************
860 '*  CARD DISPLAY BEGINS  *
870 '*************************
```

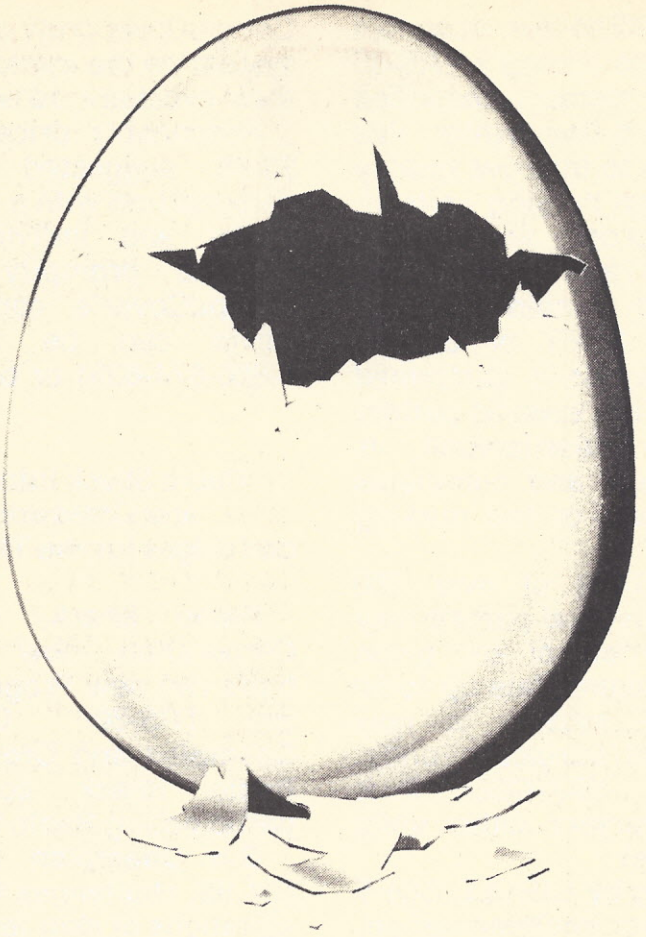
```
880 :  CLS0
890 :  PP=32:'***** PRINT POSITI
ON
900 :  PRINT@0,"player";
910 :  PRINT@256,"bank";
920 :  FOR DR=1 TO 2:'***** DRAW
 CARD BACKS
930 :     FOR DC=1 TO 5
940 :        PRINT@PP,CB$;
950 :        PRINT@PP+11,CB$;
960 :        PP=PP+32
970 :     NEXT DC
980 :     PP=288
990 :  NEXT DR
1000 :  FOR D=1 TO 4
1010 :     GOSUB 2730:'***** PIC
K A CARD
1020 :     FOR T=1 TO 300
1030 :     NEXT T
1040 :     H(D)=L
1050 :     IF H(D)=>10 THEN H(D)
=0:'***** FACE CARDS COUNT ZERO
1060 :     IF D=1 THEN PP=32
1070 :     IF D=2 THEN PP=288
1080 :     IF D=3 THEN PP=43
1090 :     IF D=4 THEN PP=299
1100 :     GOSUB 3020:'***** DIS
PLAY CARD
1110 :  NEXT D
1120 '
1130 '
1140 '*************************
1150 '* THE RULES OF BACCARAT *
1160 '*************************
1170 :  PS=0:BS=0:'***** FLAGS
1180 :  PT=H(1)+H(3):'***** PLAY
ERS TOTAL
1190 :  IF PT=>10 THEN PT=PT-10
1200 :  BT=H(2)+H(4):'***** BANK
S TOTAL
1210 :  IF BT=>10 THEN BT=BT-10
1220 :  IF PT=>8 THEN PRINT@119,
"NATURAL";
1230 :  IF BT=>8 THEN PRINT@376,
"NATURAL";
1240 :  IF PT=>8 OR BT=>8 THEN 1
360
1250 :  IF PT=6 OR PT=7 THEN PS=
1:PRINT@192,"PLAYER STANDS";
1260 :  IF BT=7 THEN BS=1:PRINT@
448,"BANK STANDS";
1270 :  IF BT=6 AND PS=1 THEN BS
=1:PRINT@448,"BANK STANDS";
1280 :  IF PS=1 AND BS=1 THEN 13
60
1290 :  IF PS=0 THEN GOSUB 2050:
'***** PLAYERS THIRD CARD
1300 :  IF BS=1 THEN 1360
1310 :  IF BT<=2 THEN 2380:'****
* BANKS THIRD CARD
1320 :  IF BT=3 AND (H(5)=9 OR H
(5)<=7) THEN 2380
1330 :  IF BT=4 AND H(5)=>2 AND
H(5)<=7 THEN 2380
1340 :  IF BT=5 AND H(5)=>4 AND
H(5)<=7 THEN 2380
1350 :  IF BT=6 AND (H(5)=6 OR H
(5)=7) THEN 2380
1360 :  PRINT@208,"PLAYERS TOTAL
"PT;
1370 :  PRINT@466,"BANKS TOTAL"B
T;
1380 :  PRINT@483,"PRESS ANY KEY
 TO CONTINUE";
1390 :  I$=INKEY$:IF I$="" THEN
1390
1400 '
1410 '
1420 '*************************
1430 '* PRINT THE WINNER AND  *
1440 '*    CALCULATE MONEY    *
1450 '*************************
1460 :  CLS
1470 :  IF PT>BT THEN GOSUB 2180
:'***** PLAYER WINS
1480 :  IF BT>PT THEN GOSUB 2510
:'***** BANK WINS
1490 :  IF BT=PT THEN PRINT@196,
"*DRAW* ALL BETS ARE OFF"
1500 :  PRINT@483,"PRESS ANY KEY
 TO CONTINUE";
1510 :  I$=INKEY$:IF I$="" THEN
1510
1520 :  CLS
1530 :  PRINT@70,"*THE PRESENT S
TAKES*":PRINT
1540 :  FOR X=1 TO N
1550 :     PRINT P$(1,X);
1560 :     PRINTTAB(9)"";
1570 :     PRINTUSING US$;P(8,X)
1580 :  NEXT X
1590 :  PRINT@484,"DO YOU WANT A
NOTHER HAND";
1600 :  I$=INKEY$:IF I$="" THEN
1600
1610 :  IF I$="N" THEN 1790
1620 NEXT Q:'***** END OF GAME L
OOP
1630 '
1640 '
1650 CLS
1660 PRINT@196,"I'M ALMOST OUT O
F CARDS"
1670 PRINT@262,"SO I WILL RESHUF
FLE"
1680 FOR X=1 TO 13
```

```
1690 :  FOR Y=1 TO 32
1700 :     C(X,Y)=0
1710 :  NEXT Y
1720 NEXT X
1730 GOTO 430
1740 '
1750 '
1760 '*************************
1770 '*       THE SUMMARY       *
1780 '*************************
1790 FOR X=1 TO N
1800 :  CLS
1810 :  PRINT@64+((32-LEN(P$(1,X
)))/2),P$(1,X)
1820 :  PRINT:PRINT" WON ";:PRIN
TUSING US$;P(3,X);:PRINT" IN"P(5
,X)"HANDS"
1830 :  PRINT:PRINT" LOST";:PRIN
TUSING US$;P(4,X);:PRINT" IN"P(6
,X)"HANDS"
1840 :  PRINT:PRINT"CASINOS COMM
ISION";:PRINTUSING UC$;P(7,X)
1850 :  PRINT:PRINT"YOU STARTED
WITH";:PRINTUSING US$;P(1,X)
1860 :  PRINT:PRINT"YOU NOW HAVE
    ";:PRINTUSING US$;P(8,X)
1870 :  IF X=N THEN PRINT@488,"S
UMMARY COMPLETE";:GOTO 1890
1880 :  PRINT@489,"PRESS ANY KEY
";
1890 :  I$=INKEY$:IFI$=""THEN189
0
1900 NEXT X
1910 '
1920 '
1930 CLS
1940 END
1950 '
1960 '
1970 '              ***********
**********
1980 '                  THE SUBROU
TINES
1990 '              ***********
**********
2000 '
2010 '
2020 '*************************
2030 '*  PLAYERS THIRD CARD    *
2040 '*************************
2050 GOSUB 2730:'***** PICK CARD
2060 PP=54
2070 GOSUB 3020:'***** PRINT CAR
D
2080 H(5)=L
2090 IF H(5)=>10 THEN H(5)=0
2100 PT=PT+H(5)
2110 IF PT=>10 THEN PT=PT-10
2120 RETURN
2130 '
2140 '
2150 '*************************
2160 '*       PLAYER WINS       *
2170 '*************************
2180 PRINT@73,"*PLAYER WINS*":PR
INT
2190 FOR X=1 TO N
2200 :  IF P$(2,X)="" THEN 2310
2210 :  IF P$(2,X)="B" THEN 2270
:'***** BET ON BANK
2220 :     P(3,X)=P(3,X)+P(2,X)
2230 :     P(5,X)=P(5,X)+1
2240 :     P(8,X)=P(8,X)+P(2,X)
2250 :     PRINT P$(1,X);:PRINTT
AB(9)"WON ";:PRINTUSING U$;P(2,X
)
2260 :     GOTO 2310
2270 :  P(4,X)=P(4,X)+P(2,X)
2280 :  P(6,X)=P(6,X)+1
2290 :  P(8,X)=P(8,X)-P(2,X)
2300 :  PRINT P$(1,X);:PRINTTAB(
9)"LOST";:PRINTUSING U$;P(2,X)
2310 NEXT X
2320 RETURN
2330 '
2340 '
2350 '*************************
2360 '*   BANKS THIRD CARD    *
2370 '*************************
2380 GOSUB 2730:'***** PICK CARD

2390 PP=310
2400 GOSUB 3020:'***** PRINT CAR
D
2410 H(6)=L
2420 IF H(6)=>10 THEN H(6)=0
2430 BT=BT+H(6)
2440 IF BT=>10 THEN BT=BT-10
2450 GOTO 1360
2460 '
2470 '
2480 '*************************
2490 '*       BANK WINS         *
2500 '*************************
2510 PRINT@74,"*BANK WINS*":PRIN
T
2520 FOR X=1 TO N
2530 :  IF P$(2,X)="" THEN 2660
2540 :  IF P$(2,X)="P" THEN 2620
:'***** BET ON PLAYER
2550 :     P(3,X)=P(3,X)+P(2,X)
2560 :     P(7,X)=P(7,X)+P(2,X)*
5/100
2570 :     P(5,X)=P(5,X)+1
2580 :     P(8,X)=P(8,X)+(P(2,X)
-P(2,X)*5/100)
2590 :     PRINT P$(1,X);:PRINTT
AB(9)"WON ";:PRINTUSING U$;P(2,X);
```

```
2600 :      PRINT" COM";:PRINTUSI
NG UC$;P(2,X)*5/100
2610 :      GOTO 2660
2620 :   P(4,X)=P(4,X)+P(2,X)
2630 :   P(6,X)=P(6,X)+1
2640 :   P(8,X)=P(8,X)-P(2,X)
2650 :   PRINT P$(1,X);:PRINTTAB(
9)"LOST";:PRINTUSING U$;P(2,X)
2660 NEXT X
2670 RETURN
2680 '
2690 '
2700 '**************************
2710 '* ONE CARD FROM 8 DECKS *
2720 '**************************
2730 L=RND(13):S=RND(32)
2740 IF C(L,S)=-1 THEN 2730
2750 C(L,S)=-1
2760 ON L GOTO 2770,2780,2790,28
00,2810,2820,2830,2840,2850,2860
,2870,2880,2890
2770 PC$(1)="ACE":GOTO 2900
2780 PC$(1)="TWO":GOTO 2900
2790 PC$(1)="THREE":GOTO 2900
2800 PC$(1)="FOUR":GOTO 2900
2810 PC$(1)="FIVE":GOTO 2900
2820 PC$(1)="SIX":GOTO 2900
2830 PC$(1)="SEVEN":GOTO 2900
2840 PC$(1)="EIGHT":GOTO 2900
2850 PC$(1)="NINE":GOTO 2900
2860 PC$(1)="TEN":GOTO 2900
2870 PC$(1)="JACK":GOTO 2900
2880 PC$(1)="QUEEN":GOTO 2900
2890 PC$(1)="KING"
2900 IF S<9 THEN 2940
2910 IF S>8 AND S<17 THEN 2950
2920 IF S>16 AND S<25 THEN 2960
2930 PC$(2)="CLUBS":RETURN
2940 PC$(2)="SPADES":RETURN
2950 PC$(2)="HEARTS":RETURN
2960 PC$(2)="DIAMONDS":RETURN
2970 '
2980 '
2990 '**************************
3000 'PRINT CARD INSIDE BLANKS*
3010 '**************************
3020 T=INT((10-(LEN(PC$(1))))/2)
3030 U=INT((10-(LEN(PC$(2))))/2)
3040 PRINT@PP,BB$;
3050 PRINT@PP+32,BB$;
3060 PRINT@PP+32+T,PC$(1);
3070 PRINT@PP+64,"    OF    ";
3080 PRINT@PP+96,BB$;
3090 PRINT@PP+96+U,PC$(2);
3100 PRINT@PP+128,BB$;
3110 RETURN
```

# NEW PRODUCTS



## SPACE RACE

Spectral Associates is pleased to announce the release of Space Race, our latest arcade quality, machine language game. Space Race features a four cornered "race track" in space in which the player maneuvers his ship while destroying hordes of alien ships. Great sound and high resolution color graphics makes this a fantastic arcade quality game. Collectors, Swarmers, and Berserkers combine to make the alien opposition fierce. There are 16 skill levels to choose from as well as the difficulty level increasing with each screen cleared.

Ship control is excellent in Space Race. The player will realize this benefit when bouncing off walls and outdistancing alien ships as well as maneuvering into position to fire. At higher skill levels the race track disappears and the game becomes a free-for-all space battlefield.

Space Race is a machine language game especially written for the TRS-80, TDP-100, and Dragon Color Computers. System requirements are 16K RAM non-extended basic and joysticks are optional.

CIRCLE SOFT announces a NURSE STAFFING/PATIENT CLASSIFICATION SYSTEM for hospitals and health care institutions. Using a TRS-80 Color Computer with 32K memory, extended color basic, disk drive, and line printer, this inexpensive system performs staffing analysis comparable to systems at ten times the cost. Up to nine patient classifications can be accommodated per unit and there is no limit to the number of nursing units which the system can handle. The system prints daily, weekly, monthly, and year-to-date staffing and productivity reports. Both 12 month calendar and 13 month fiscal year reports can be produced. A typical installation may require some on sit consulting by CIRCLE SOFT staff for the development of standards. For further information please write or call:

A. Lee Messer, III
CIRCLE SOFT
3325 Woodbine Lane
Charlotte, NC 28210
(704) 554-8315

CIRCLE SOFT announces a PATIENT

CARE PLANNING SYSTEM for hospitals and health care institutions. Using a TRS-80 Color Computer with 32K memory, extended color basic, disk drive, and line printer, this inexpensive system helps to improve quality of care and productivity on nursing units.

Doctor's and Nurses orders are entered directly into the system and patient care plans are organized and printed for each patient. Using CIRCLE SOFT or custom standards, a staffing analysis is performed by the system, based on the specific patient care orders. Patient classification is accomplished automatically and eliminates individual bias on the part of the nursing staff.

The system uses a base of over 350 standard orders and an idividual patient may have as many as 125 orders at any given time. The system can accommodate up to 50 patients per unit. The system is now developed for Medical/Surgical units, pediatrics, NICU/PICU, ICU/CCU, Post Partum, and New Born Nursery. Other units can also be accommodated.

Some on-site consulting by CIRCLE SOFT staff may be neccessary for implementation.

For further information, please call or write:

A. Lee Messer, III
CIRCLE SOFT
3325 Woodbine Lane
Charlotte, NC 28210
(704) 554-8315

## NEW ADVENTURES AT COMPUCOVER

CompuCover is moving into the future with many exciting new ideas. For the first time their custom fitted, static-free computer dustcovers are available not only in the popular and well known tan or black cloth backed vinyl, but also in a deluxe clear plastic. Static free CompuCovers are tough and durable. The combination of elegance and protection they provide has made them the standard of the computer industry.

CompuCover has an extensive product line with hundreds of different designs on file. If a customer can not find his particular piece of equipment on CompuCover's list, then CompuCover's design department will gladly custom fit a cover to their needs. CompuCover truly can cover every computer system on the market while still maintaining their excellent delivery schedule.

Reasonably price CompuCovers start at $3.95 suggested retail, and can be personalized with a customer's own logo. All dealer and individual inquiries will be handled promptly and courteously by CompuCover's competent staff. CompuCover can be reached toll free at 1-800-874-6391 or by Telex # 469-783.

## Radio Shack introduces Gin Champion and Crosswords Program Pak® cartridges for the TRS-80® Color Computer.

Radio Shack, a division of Tandy Corporation, now offers computer game buffs two new Program Pak® cartridges for the TRS-80® Color Computer. **Gin Champion** and **Crosswords** are available at Radio Shack computer Centers and participating Radio Shack stores and dealers.

**Gin Champion** (26-3083), available for $34.95, challenges the player in sixteen gin variations at skill levels ranging from one to ten. Variations include Oklahoma Gin, Runs Around the Corner, Laying Off on Gin, Spades Double and more. The game features colorful graphics in one of two color schemes and offers simple commands or joysticks (optional) to maneuver the cards in the hand and during draw and discard functions.

**Crosswords** (26-3082), available for $24.95, allows from one to four players to create words from a group of randomly selected letters and position them on a playing area to form a crossword pattern. Players' options include combination or single play mode selection and various time limits for each turn. Play is controlled by using simple keyboard commands or joysticks (optional).

**Gin Champion** and **Crosswords** require a TRS-80 Color Computer with a minimum of 16K of memory and a color television set.

## Radio Shack now offers **Personafile** personal record keeping software for the TRS-80® Color Computer.

Radio Shack, a division of Tandy

Corporation, now offers TRS-80® Color Computer owners an efficient way to keep track of personal and household records with a new disk software program. **Personafile** (26-3260) is available for $59.95 at Radio Shack Computer Centers and participating Radio Shack stores and dealers.

**Personafile** provides access, add and update functions for up to 540 user-formulated information records categorized by up to 250 general subject and specific tag designations. Simple commands make it easy to enter and retrieve a variety of information including addresses and phone numbers, car maintenance history, household inventories and more. Information and reports can be printed on an (optional) printer.

**Personafile** requires a TRS-80 Color Computer with extended Basic, disk interface and disk drive.

Transformation Technologies recently released the C.C. Calc electronic spreadsheet for the TDP and TRS-80 Color Computers. C.C. Calc looks and acts like one of the $100 plus spreadsheets that has been tailored to the Color Computer. Arithmetic operators including exponentiation are supported along with summation, formula duplication, and repeating labels. Special features include hidden formulas, a screen printer, and operator specified decimal place.

C.C. Calc will print reports in regular or narrow print and extra wide reports can be printed in sections. Files may be shared with other programs through a standardized data exchange format.

C.C. Calc costs $25 for disk or cassette, requires 32K, and a printer is recommended.

Trans Tek
194 Lockwood
Bloomingdale, IL 60108

*Soringfield, Virginia - Ocean, Inc.*, a small Northern Virginia publisher, has just announced the release of a new software listing book of interest to TRS-80 users. The new publication, entitled the *TRS-80© Programmer's Sourcebook* is a collection of listings of not only application software but system software as well, and includes items of related interest such as a listing of reference publications, including books, periodicals and other miscellaneous items, plus a listing of clubs that welcome TRS-80 users. The sourcebook also accepts full page advertising. The new book, which is offered in both an 8 1/2 by 11 inch paperback and hardback format, is divided into sections by the respective computer models. The user no longer has to thumb through all the listings looking for those that will operate on a particular model computer. The first edition, which was released in January 1983, contains 80 pages and presents the listing in an attractive and informative manner.

The new publication will be issued on a semi-annual basis in January and July of each year and will include a complete listing of software offered by both individuals and software houses that submit a listing request. It operates in much the same manner as Radio Shack's Application Sourcebook (26-2114), except that the *TRS-80© Programmer's Sourcebook* offers a much broader base of information. The most significant difference is the inclusion of system software which Radio Shack will not list in their publication. The *TRS-80© Programmer's Sourcebook*, on the other hand, welcomes all system software and has it divided into the following categories: Operating systems, languages, I/O services, data management systems, editors, debugging tools, routines, and utilities. The publisher indicates that future editions will include a category for assemblers/disassemblers.

The publisher is looking for national distribution and is offering the publication to all dealers, computer stores, book stores, and other retailers at standard trade terms (ISBN 0-912043-00-8). It is also available to the public direct from the publisher at the retail price of $4.95 (plus $1.00 shipping and handling). The publisher is also soliciting listings (particularly system software listings) and advertising for the July 1983 issue which has a May 1, 1983 deadline. Details can be obtained from Ocean, Inc., P.O. Box 2331, Springfield, Virginia 22152-0331, or by calling (703) 323-1928.

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64K CORES-64
Tape Editor/Assembler

CORES-64 is one of our latest products released to support the new 64K versions of the Color Computer and TDP 100 systems. It DOES NOT REQUIRE a DISK SYSTEM or FLEX or anything other than a Color Computer with at least 16K of memory. This new version of our already popular editor/assembler package "CORES9", supports the use of either 16, 32 or 64K systems. In a 16K system only 3K is available, in a 32K system 19K is available in a 64K system there is over 52K of workspace available to the programmer. This version of CORES still contains all the versatile features of our full featured Text Editor with a few enhancements. This is the most powerful and easy to use text editor available in any editor/assembler package for the Color Computer today. It is extremely fast in editing text files and is compatible with Basic ASCII formatted tape files.

The Editor itself includes over 25 commands including string search and replace, line and automatic line edit modes which allow you to insert, delete, change or add characters. Automatic line editing allows you to skip forward and backward for checking and editing, all screen editing immediately updates the screen so you know exactly what you are doing at all times. The Editor also has commands to move or copy single lines or blocks of text from one place to another. Some of the other commands include Tape load, save and append; Automatic line numbers, delete line, set input line length and printer output for listings, searches etc.

The Assembler supports the full compliment of the 6809 instruction set with all addressing modes and it will cross assembler 6800 source code to produce 6809 compatible object code. It also supports the standard assembler directives: ORG, END, RMB, FDB, FCB, FCC, EQU, PAG, SPC, NAM and OPT. Line numbers are included in the listing for easy location of errors in the source file. A demonstration program listing and source file is included on the tape to help answer questions and allows the novice or beginner to work with a known working program.

CORES9 standard editor/assembler on tape .....$29.95
CORES9 upgrade to CORES-64 includes new manual..... $14.95
CORES-64 64K enhanced Editor/Assembler on tape .....$34.95

Please include $2.50 for shipping and handling

CONTINUOUS CHECK SYSTEM DESIGNED ESPECIALLY FOR THE HOME OR COTTAGE BUSINESS USER

SYNERGETIC SOLUTIONS, a two year young company dedicated to producing ideas that really work, announces the release of a line of continuous fan-fold checks and accessories designed especially for use in the home or small cottage business.

These unique checks are the universal 9 1/2" computer form width and are fan-folded three to a page. They can be used on any tractor, pin or friction feed printing device capable of printing 10 characters per inch (80 columns per line).

The uniqueness of these checks lies in their personal size desk style design with end stub and the fact that they are well suited for manual use and/or batch printing by computer.

SYNERGETIC SOLUTIONS also offers a complete line of accessories for their checks which adds to their uniqueness and forms a complete home checking system. Accessories include a data ring checkbook for storage and dual windowed envelopes which eliminate addressing chores.

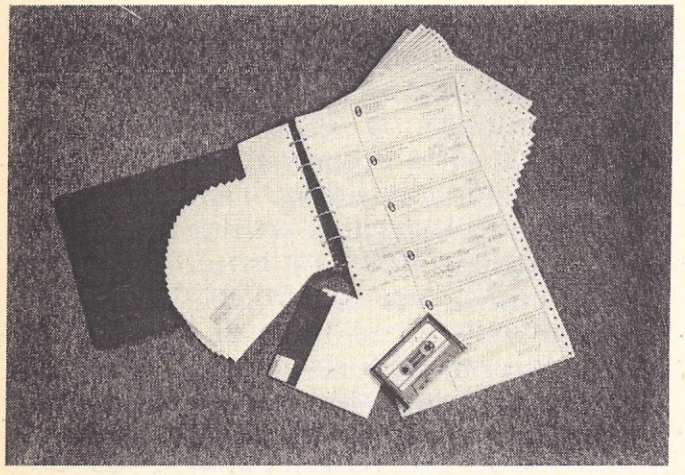
To complete this system the company offers a versatile and easy to use program, "CHECKBOOK-CHECKWRITER II", that allows the system to be put into use within minutes of purchase. This versatile program allows printing of a single check as well as batch printing of monthly or even erratically scheduled checks with only a few keystrokes. The program prints the check stub for a permanent record as well as creating data files for user manipulation.

SYNERGETIC SOLUTIONS offers special

packages of 200 and 500 continuous checks which include checkbook, dual windowed envelopes and a cassette version of its "CHECKBOOK-CHECKWRITER II" program with owner's manual. The 200 check package is priced at $59.95 and the 500 check package is $79.95. This special package price represents a savings over individual item purchase. The "CHECKBOOK-CHECKWRITER II" program is available on cassette or disk for most popular home computer systems.

For more information on this unique home or cottage business checking system write or phone: SYNERGETIC SOLUTIONS, 4715 Shepherd Road, Mulberry, Florida, 33860. Phone (813) 646-6557.

(INSERT PICTURE)



TECHNICAL EDUCATION RESEARCH CENTERS

The Spring, 1983 series of hands-on workshops, Microcomputers in Education, sponsored by Technical Education Research Centers (TERC), will be held in the following locations.

Bellingham, WA - March 22-24
Raleigh, NC - April 6-8
Cambridge, MA- April 28-30
Watertown, CT - June 9-11

The workshops are designed for teachers and administrators at all levels.

Topics include:

1. Overview of Educational Uses of Microcomputers
2. Microcomputers in Science Instruction
3. Microcomputers in Math Instruction
4. Administrative Uses of Microcomputers
5. Logo I
6. Logo II
7. Pascal I
8. Pascal II
9. BASIC I
10. BASIC II
11. Machine Language
12. Microcomputers as Laboratory Instruments
13. Microcomputers and the Education of Special Needs Students

Each workshop emphasizes hands-on experience with the computer and uses a variety of microcomputers.

For information on these and upcoming workshops, contact Ms. Sharon Woodruff, Director of Training Services, TERC, 8 Eliot St., Cambridge, MA 02138 (617-547-3890).

VOICE RECOGNITION IS NOW AVAILABLE FOR THE 16K TRS-80 COLOR COMPUTER as ColorSoft Software Co. introduces COLOR TALK TO ME!

COLOR TALK TO ME, by Cary D. Perttunen, is a revolutionary new software oriented voice recognition package. Using your cassette recorder's condenser microphone, COLOR TALK TO ME can use your own voice as an alternate means of input for any of your existing BASIC programs. With a little practice, you can attain from 80% to over 90% accuracy for most applications. Over 200 words can be stored in a 16K Color Computer.

Included in the package are the COLOR TALK TO ME machine language subroutine, the BASIC subroutine which can merge COLOR TALK TO ME with your existing programs, complete instructions on how to use and incorporate COLOR TALK TO ME in BASIC programs, and two application programs to show how COLOR TALK TO ME can be used: Screen Painter and Voice Calc. In Screen Painter, you say the name of one of the Color Computer's nine colors and the screen will be painted that color. In Voice Calc, use your voice to enter arithmetic problems and Voice Calc will display the solution.

COLOR TALK TO ME is great for professional programmers since ColorSoft Software will market original programs using COLOR TALK TO ME with generous royalties in return. It is also great for the

average computer hobbyist since ColorSoft Software will soon be releasing voice recognition programs which can be used once you buy COLOR TALK TO ME. It is also ideal for making computer programs easier to access for disabled persons.

The COLOR TALK TO ME Software Package is available on two cassettes for $49.95 (plus $2.00 shipping and handling) from:

ColorSoft Software Co.
11764 Raintree Ct.
Utica, MI 48087

GIMIX introduces the GMX III 6809 CPU board and OS-9 GMX III. The new CPU board is an advanced design, specifically intended for use with multi-user, multi-tasking operating systems. OS-9 GMX III is an enhanced OS-9 Level II that takes full advantage of the features of the new CPU board. The price for the combination of CPU board and software is $1698.01.

Built on a multi-layer (6) circuit board and utilizing high-speed, high-density logic, the GMX III 6809 CPU board enhances the performance of the 2 MHz 68B09 by providing such features as high-speed (1 byte/microsecond) DMA block transfers from memory to memory or between memory and I/O devices (such as the GIMIX Intelligent 3 Port Serial Interface) and advanced memory management with 2K segments and segment attributes. The board automatically arbitrates DMA contention between the on board DMA and external DMA devices such as disk controllers. The 2K memory segments allow more efficient memory usage. The segment attributes allow the trapping of out-of-range memory references (to protect one user's or task's memory from being accessed by another), write protection (to protect sharable data and programs from modification which could affect the entire system), and a hardware single step function for software debugging (on an individual user basis without affecting other users or tasks).

The board prevents the execution of certain illegal instructions from crashing the system by monitoring interrupts to the 6809 and its response to them (these instructions cause the 6809 to lock up in a state in which it does not respond to any interrupts and must be reset). If the processor does not respond to an interrupt within a specific time (128 clock cycles) the board resets the 6809 (other active tasks are not affected). This also limits the length of time that interrupts can remain masked by a user, preventing users from keeping the system from task switching and servicing other users.

To further protect the system from the users, the CPU board supports separate user and system ''states'' with automatic switching to the system state in response to interrupts and system (SWI) calls. Certain functions and memory areas can only be accessed in the system state, preventing unauthorized accesses.

Also included on the new CPU are an improved full function time-of-day clock (MC 146818) with year and automatic leap year/daylight savings time correction, and a 2K scratchpad RAM; both with battery backup standard. To provide precision timing functions, a 6840 PTM with a separate 500 KHz precision (.0025%) time based oscillator is included. The oscillator is easily user replaceable to provide other time base frequencies (750 KHz max). The single EPROM socket will accept 2K, 4K or 8K EPROMs, with a maximum of 4K mapped into the system address space at any one time. Software switching is implemented by selecting the upper or lower half of an 8K EPROM under hardware or software control.

By taking advantage of the features of the GMX III CPU, OS-9 GMX III is faster, more memory efficient, and a more secure multi-user/multi-tasking operating system than OS-9 GMX II, from which it is derived, while retaining complete software compatibility. Throughput is enhanced by the memory to memory DMA and the automatic task switching, while the memory attributes and illegal instruction trapping protect the system and individual user from each other. Sharable system modules in RAM are write protected to prevent tampering. Memory mapping in 2K segments and the ability to load modules in non-contiguous RAM provide more efficient memory utilization. Each task can be allocated a full 64K of RAM, with no operating system overhead in the tasks address space. Future plans for OS-9 GMX III include an optional hardware single stepping Debugger.

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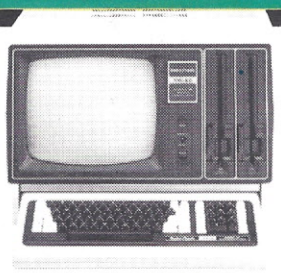

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Model III 48K
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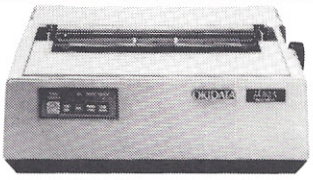

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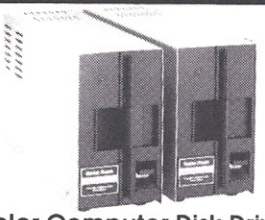

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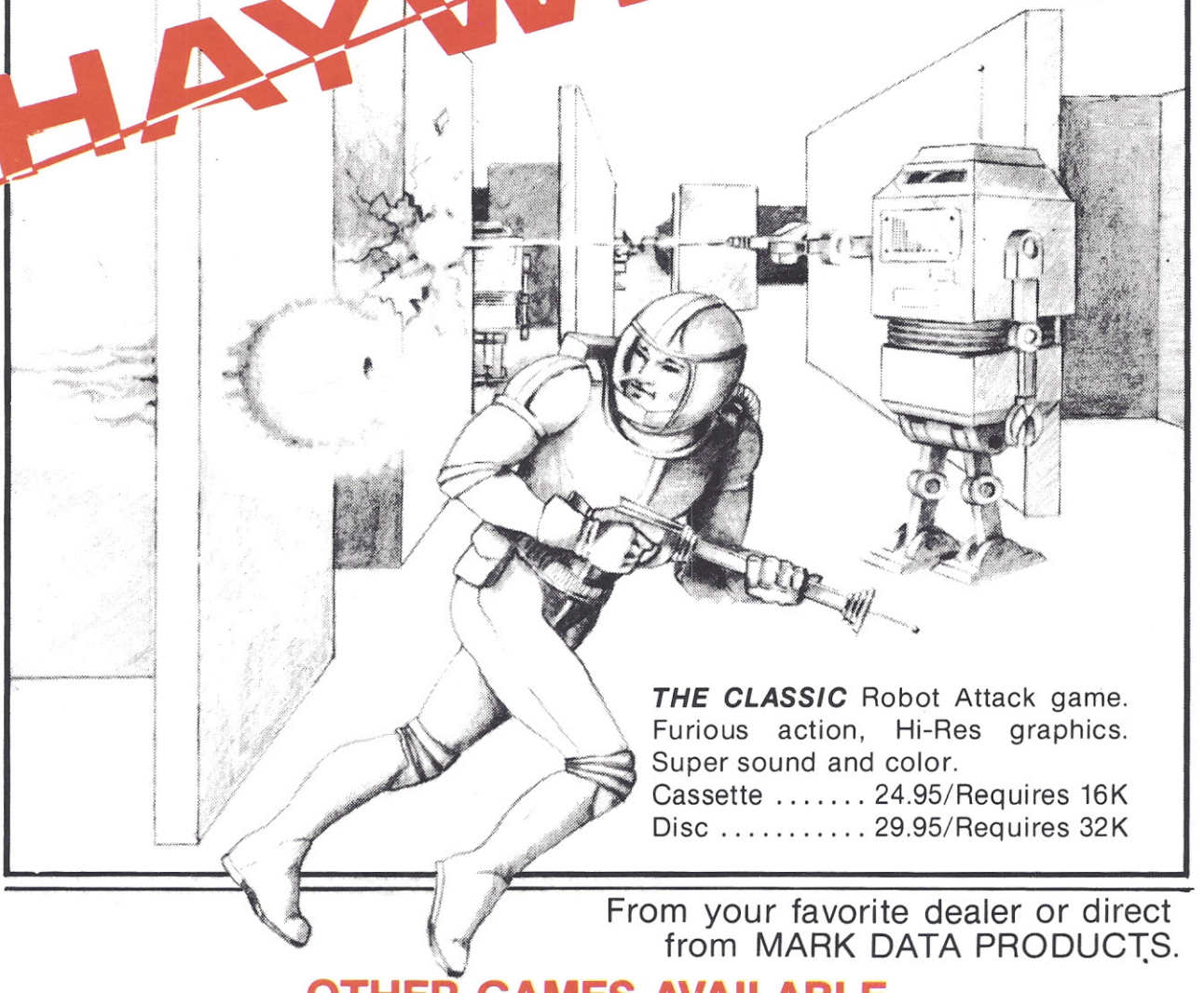

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**SOFTWARE FEATURES:**

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- ★ OS-9 Assembler

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Winchester packages are available for upgrading current **GIMIX** 6809 systems equipped with DMA controllers, at least one floppy disk drive, and running FLEX, OS-9 LEVEL ONE or OS-9 LEVEL TWO. The packages include one or two 19MB (unformatted) Winchester drives, DMA Hard Disk Interface, and the appropriate software drivers. The Interface can handle two 5¼" Winchester Drives, providing Automatic Data Error Detection and Correction: up to 22 bit burst error detection and 11 bit burst error correction.

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